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# AMERICAN JOURNAL of PUBLIC HEALTH

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## ANNOUNCEMENT

### WAR MEETING, WASHINGTON, D. C.

OCTOBER 17-20, 1917

It is difficult to obtain hotel accommodations at Washington. Read the announcement regarding hotels on page 887 of this issue before writing for reservations.

The programs of the meetings are given on pages 882 to 906.

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American Journal of Public Health
Official Monthly Publication of the American Public Health Association
Vol. VII OCTOBER, 1917 No. 10

# THE RED CROSS AND RELIEF IN CIVILIAN COMMUNITIES.

FRED R. JOHNSON,
*Secretary, Committee on Civilian Relief, Metropolitan Chapter of the American Red Cross.*

Read before the Massachusetts Association of Boards of Health, July 26, 1917.

IN A discussion of its work it is well to bear in mind the nature of Red Cross organization. This society is organized not on state lines, but by chapters. There are a number of these in Massachusetts. Thus, the Metropolitan Chapter includes Boston and surrounding towns. Essex County has one; Worcester, Lynn, and other cities have others. Since the outbreak of the war with Germany the number of chapters has multiplied with great rapidity.

It is inevitable that with a multiplicity of chapters, some on the county plan, some on the city plan, some in rural districts, and others in urban communities, there should be a variation of function in so far as civilian relief is concerned. For the purposes of this discussion it will consequently be necessary for me to discuss the work of the Civilian Relief Committee of the Metropolitan Chapter of the Red Cross.

Our committee is concerned with two main tasks. The first of these is the relief of families of soldiers and sailors who have been called to the colors. The second deals with relief work in disasters.

It is proper that the federal government and the Commonwealth of Massachusetts should make most of the financial provision for families when men enlist for war or are drafted for war service. The responsibility is of a public character. Were not the men in the army they would receive more pay and with certain exceptions be better able to care for their families. This theory has been followed. When hostilities seemed likely, Massachusetts quickly provided that in addition to the amount received from the federal government each enlisted man of the Massachusetts quota should be paid $10 a month. In addition an amount not to exceed $40 might be provided as relief for dependent families out of the state funds. Since the commonwealth took this action the federal government has raised the regular pay of privates to $30 a month. Accordingly federal pay, plus state pay, plus the maxi-

mum granted under the state allowance in Massachusetts may total $80 a month given to men of the ranks and their families if in need.

Since the basic relief is provided by the federal and state governments it may be asked what is the function of the Red Cross with reference to these families. We have found it to be threefold:

1. The Red Cross has assisted in making provision for dependent families of men in the regular army and navy who do not belong to the Massachusetts quota, and consequently are not entitled to provision made by the state.

2. The Red Cross steps in when, through necessary delays in official machinery, state grants are not available.

3. The Red Cross helps to provide friendly service of all sorts. This is, perhaps, its most important function.

Let me briefly outline some of the friendly tasks which the Red Cross is called upon to perform.

When the father, son, or brother is called away it often means the removal of the one who has been relied upon for counsel in regard to business matters. The wife or mother may be almost helpless. She needs some one to counsel with her concerning problems which arise. If there are no children she may desire to go to work and asks for help in securing suitable employment. Frequently there is illness in the home and the Red Cross is relied upon to assist in securing medical attention. There may be legal tangles on which advice is needed, and there is often a sense of loneliness to be overcome added to the mental stress which is inevitable when the husband, son or father is enlisted for war service.

These are but some of the tasks which come to the workers in civilian relief in their daily contact with families in addition to the provision of money for relief.

The second function with which our committee has concerned itself is that of disaster relief. Those of us who live in Massachusetts well remember the tremendous fires at Chelsea and Salem. We know that the wooden three-decker construction in Boston and some of the cities in the surrounding territory invite similar conflagrations at this time. To these dangers, present both in peace and war, are added the perils resulting from the rapid development of munition factories in some of our centers of population. I believe that even the most optimistic among us will share the belief that a disaster is not wholly improbable and that we should be ready when it comes.

Several members of our committee on civilian relief had experience not only in relief work following the Chelsea and Salem fires, but also at the time of the disaster in San Francisco. They were keenly conscious of our lack of organization and preparation to care for the suffering resulting from these catastrophes. Accordingly, an organization has been developed ready to spring into existence at once when the relief of a large group of our population becomes necessary. Committees on purchase of supplies, immediate food, shelter, and rehabilitation have been appointed, ready to take up their work with a general plan of action

outlined and a squad ready for emergency action has been enlisted.

Just a word in regard to the relationship of our Committee on Civilian Relief to the Massachusetts State Department of Health. One of the men of that department is a member of our committee. It has been the purpose of the Metropolitan Chapter of the Red Cross to work in hearty coöperation with the State Department of Health should a catastrophe occur, well realizing that with an efficient state department, measures of sanitation and medical relief can best be developed under the jurisdiction of that department.

May I, in conclusion, stress the necessity of coöperation between different sections of the state. If a disaster should occur, shall we say in Essex County, the help of the Metropolitan Chapter might be necessary. On the other hand, should the disaster occur in Boston, or its suburbs, we would welcome the help of other Red Cross chapters throughout the state. The New England Division of the Red Cross has sent out a circular letter calling to the attention of the different chapters the necessity of following such a plan of coöperation and interaction to which there has been a cordial response.



# A SIMPLE MEDIUM FOR THE RAPID DIFFERENTIATION OF TYPHOID AND PARATYPHOID BACILLI.

I. J. Kligler.

(Abstract.)

THE concentration of large bodies of men always involves the danger of the spread of infectious diseases. Epidemics of intestinal diseases, such as typhoid, paratyphoid and dysentery, are usually most prevalent. This has been the experience of the European armies, while among our own men at the Border and in the concentration camps an epidemic of paratyphoid has been reported. Under such circumstances it is, of course, important that the nature of the disease be promptly diagnosed so that proper measures be taken to treat as well as check the spread of the disease. This is not always possible in the best field laboratory where the materials are few and the facilities for rapid diagnosis limited.

This paper discusses a new simple medium, readily prepared from cheap and easily obtainable ingredients. This medium has proven satisfactory for the differentiation of bacilli causing typhoid, paratyphoid A, paratyphoid B and dysentery, respectively. If cultures are made from blood a diagnosis can be made in eighteen to twenty-four hours. When the stool is used results can be obtained in forty-eight hours. This medium is a modification of one reported to have been used successfully in a French field hospital by *Burnet* and *Weissenbach*. It consists of a 0.5 per cent. nutrient agar containing 0.05—0.1 per cent. lead acetate and 0.2 per cent. glucose.

B. typhi produces *browning without gas.*

B. paratyphi B. produces *browning with gas.*

B. paratyphi A. produces *no browning but produces gas.*

B. dysentery produces *no browning and no gas.*

# A LARGE CONCENTRATION CAMP IN ITS RELATION TO A CIVILIAN COMMUNITY.

CHARLES E. SIMPSON, M. D.,
*District Health Officer, Massachusetts State Department of Health.*

Read before the Massachusetts Association of Boards of Health, July 24, 1917.

A COUNTRY with but a small standing army, not given to military training, accustomed to concentration camps of only a few companies, or at the most, a single regiment, at its annual two-weeks muster, a sort of military picnic, suddenly finds itself in a state of war, where many nations with millions of well-trained men, equipped to the minute, are struggling against other nations, with their millions in well-trained and equipped armies.

It is true that for three years societies and organizations in the United States (for it is of that nation that I am speaking), had been collecting and spending large sums of money, and giving much thought and time, in a sort of charitable way, to the sufferers in the various pursuits of life among the combating nations. But this was not our own war, and it is some question whether the kind of organization for that work was of any real value when it came to organizing for our own need; or whether, like the formaldehyde fumigation, it gave us a false feeling that we were secure and well prepared for certain phases of the conflict.

As soon as the proclamation was made by the President, declaring that a state of war existed, the problem became acute for ways and means of organizing an effective army from the material on hand. The regulars would need but short training, and they were quickly shipped abroad to be taught the methods of present warfare near the firing line. The problem was harder for the National Guard, and more particularly for the raw recruits that were to be selected by draft, and as quickly as possible put into condition for effective warfare.

As soon as it was reasonably decided that there was to be a concentration camp in Massachusetts, Dr. Allan J. McLaughlin, the Commissioner of Health for Massachusetts, being a veteran in the federal public health service, and having had much experience around military camps, realized that we were to be confronted by a serious problem. As soon as he was satisfied that a camp for thirty thousand soldiers was to be established in the vicinity of Ayer, he appointed a committee of three district health officers to study the situation and make a report.

Their report showed that the towns in which the camp is located, together with those adjoining, are Ayer, Littleton, Harvard, Lancaster, Shirley, Townsend, Groton, and Pepperell; having a population, according to the 1910 census, of from 1,039 to 2,955, aggregating 16,534. During the next five years they gained in population but 397, none of them making any

marked increase in population, and some actually falling off in the five-year period. These towns are as well organized for the preservation of health as the average Massachusetts town of their size. They have the usual sanitary conditions, consisting of little else than a good water supply; Harvard and Townsend being the only ones without a public supply for the thickly settled districts. None of them have a public sewer system; consequently most of them at times have cesspool, drainage, and privy nuisances; but few have efficient milk inspectors. All have inspectors of slaughtering, and no inspectors of provisions. All have medical inspection of schools, but not of an intensive character. Ayer, Lancaster and Pepperell have public health or district nurses, including school nursing; while Groton and Shirley have plans nearly perfected for employing similar workers. Ayer, Havard, Shirley, Groton, Lancaster, and Littleton have separate Boards of Health; while Townsend and Pepperell selectmen act also in health matters. All were doing reasonably good health work for normal conditions; while none had the organization or experienced workers that would be necessary to handle the conditions that would probably be created by such a camp. Even though they did have such organization and personnel, it also seemed clear that this was not a condition for each town to grapple with individually, but rather where uniform rules and regulations, as well as enforcement of them, were demanded, in order that one town might not receive all the influx of good population, and another permit the bad by greater leniency. That town lines must in some way be broken over so that the community could act as a unit was evident. This was readily recognized by the town boards of health, and, as is usual when they meet some extraordinary piece of work, some of them had already sought the advice of the State District Health Officer, and through him the State Health Department. Others quickly recognized the advisability of such action, and fell into line with the former. This was the more readily brought about through the policy of the State Health Department and the district health officers for the past ten years.

As the laws of Massachusetts place the enforcement of health and police regulations largely in the hands of local authorities, this had to be considered in whatever community organization was formed.

While there seemed to be no valid reason why the town officers should not do their part with both time and thought (and it is only just to these officers and the citizens at large to say they showed unusual willingness to coöperate and do what they could without too much overlapping and diversity of purpose); it did not seem right that they should be asked to shoulder the extra expense that would be incurred by extraordinary conditions brought about by the federal government.

To meet this emergency the Commissioner of Health of Massachusetts on May 21 addressed a communication upon the subject to the governor. Upon receiving this communication,

the governor, on the same day, submitted a special message to the legislature, which thereupon passed a special act which took effect on its approval on May 25. This act carried an appropriation of $20,000 to be expended by the Commissioner of Health, with the approval of the governor and council, and $10,000 for the District Police.

The problems commenced with the construction camp. It is a large undertaking to make permanent quarters for thirty thousand men, a community approaching in size the cities of Waltham or Fitchburg, in a period of less than three months, and to have the perfect sanitary condition that is necessary for the modern military camp.

Provision had to be made for a safe and desirable water supply of about four million gallons a day; as well as for the disposal of sewage from this large body of men. A board of expert engineers, one representing the State Health Department, studied the question and decided that sufficient supply of good water could be had by enlarging the Ayer station, and that the contour and character of the soil was such that a system of sand filters for the sewage was available, and preferable to any other. Land was leased by the government, and the contract was let to a firm that was accustomed to handling large operations.

In order that the soil might be left unpolluted for the soldiers when they occupied their barracks, it was essential that strict sanitary regulations among the workmen should be enforced. An officer from the regular army medical corps was detailed to look after the sanitation throughout the camp, and has been working in perfect coöperation with the State Health Department. All latrines were made deep and fly-proof, and were burned out with hay and crude oil twice a week. All kitchen refuse was carefully and quickly collected after each meal, and burned in extemporized incinerators. All cans that had contained food products were also burned clean of any residue in the incinerators and then thrown into a large hole in the ground, later to be covered. Anyone, in any part of the camp, found polluting the soil was summarily discharged. What few horses were on the grounds were kept a long distance from the quarters for the workmen, and the manure was either hauled away by the farmers or burned each day.

Among the three to five thousand workmen on such a project there would necessarily be some accidents and surgical work to be looked after. In order that time would not be lost, as well as adequate surgical attendance be at hand, a small accident hospital was established on the grounds, and the insurance company has furnished physicians in weekly shifts. All kitchen help and food handlers have been tested for typhoid carriers to make sure that no infection might be started among the laborers.

Of this large number of laborers many came from the surrounding towns where they were able to return to their homes at night. Those remaining have caused very little difference in the conditions in the towns.

Laboratory accommodations, both for bacteriological work and water

analysis, have been furnished by the state department.

There will be two distinct problems: one, the care of the soldiers and their activities inside the camp; and the other the care of the civilian population outside the camp. That inside the camp will naturally be cared for by the regular army service, together with what organizations they may deem serviceable from physical or mental viewpoints. That outside the camp will naturally fall to the care of the state and local authorities. There will not only be the population at present in the surrounding towns, but a large influx drawn for various business purposes to the immediate vicinity of the camp; most, with good intentions; some, as is usual in all quick-growing and sensational influx of population for any purpose, with not so good designs. The Secretary of War has declared a zone around the concentration camps, but not to extend over one-half mile into any incorporated city or town. As all the cities and towns in Massachusetts are incorporated, this zone will extend but one-half mile beyond the leased land of the government.

The lines of most intensive work would seem to be:

Sanitation;

Detection and care of communicable diseases;

Inspection of milk and other articles of food;

Venereal diseases; prevention, and also diagnosis and treatment;

Liquor traffic;

Care of injuries;

Care of the sick and needy.

### Sanitation.

The first object of this cantonment is to turn out soldiers in the best physical condition for their work at the front in the shortest possible time. As it has been most thoroughly proven that sanitary conditions as nearly perfect as possible must be maintained inside a military camp if the health of the soldier is to be safeguarded so should it appeal to the people living near the camp that the greatest service they can render the soldier is to take extraordinary sanitary precautions themselves, in coöperation with the camp authorities. One of the common indices of good sanitation is scarcity of flies, and when nothing is left around in which flies can breed you are making a long stride toward ideal sanitation. Privies that are poorly constructed and freely accessible to flies should be put in good repair and made fly-proof. Swill and other refuse that has been carelessly put into dumps or allowed to stand about in the yards or hen-pens should be scrupulously cared for.

### Communicable Diseases.

The soldiers will be immunized for typhoid and para-typhoid, but that will not prevent their being carriers. Epidemic cerebrospinal meningitis and pneumonia are generally considered diseases that accompany crowded conditions as in camps. The former has shown some tendency to be on the increase in Massachusetts, and some other parts of the United States. If it should occur at the camp or its vicinity it may be necessary to institute a search for carriers.

The minor diseases have been found

rather serious in concentration camps, measles in particular finding many victims, and carrying a high mortality rate. Unusual precautions must be taken in detecting and caring for these minor ailments. This should be done by householders being on the alert to either report all cases or call a physician; by the activity of the public health nurse; and by intensive school inspection and follow-up of absentees. Careful quarantine regulations must be enforced, and it may become necessary to take some building for a hospital for contagious diseases.

### Food Inspection.

Competent inspection of dairy farms, milk, and articles of food on sale must be provided for.

### Venereal Diseases.

Precautions must be taken by the police authorities, as well as careful teaching by nurses; and the providing of innocent entertainment by organized societies. In spite of this, trouble may be looked for from prostitutes with headquarters in the vicinity, as groups of women in road-houses; from prostitutes in lodging houses or other permanent quarters, and from prostitutes coming in from surrounding cities with clandestine intentions. The too friendly or sympathetic woman will also need attention. Some provision must be furnished for the detection and treatment of venereal trouble, more particularly in this latter group, but if found necessary, in all.

### Liquor Traffic.

The abuse of liquor must be guarded against from the licensed places, the unlicensed and hip-pocket barrooms in the vicinity that are selling illegally, and from camp loungers who may be used as messengers to purchase and bring in liquor.

The licensed cities and towns within comparatively easy reach of the camp are the town of Pepperell, eight miles away, with two railroad lines; Clinton, twelve miles away, with one direct railroad line; Gardner, twenty-four miles away, with a direct railroad line; and Lowell, eighteen miles, with a steam and trolley line. Express trains reach Boston in about one hour. These places can all be reached quickly by automobile over good state roads.

### Care of Injuries.

Some dispensary should be established for first-aid work, and minor injuries and cases of sickness, on account of the ordinary hazards, extra risks from congested highways, and from the increased building activities.

### Care of the Sick.

The community is even now not crowded with doctors, and of the four doctors at present in Ayer one is enlisted and will probably go to the front. With the large influx of people it is not likely that there will be an equal influx of physicians, when so many are being taken into military service. While most of the people in this community now are well housed, and living with their families, they do not particularly feel the need of hospitals; but it will not be found so easy to look after those who are taken sick out of the large number that are coming in,

many without regular homes, and probably without their families; many of these will require hospital accommodations. At present there are two small hospitals in Groton, some four or five miles away; and the next nearest are Fitchburg and Clinton, about twelve miles away. This is rather far to move a very sick case, and some provision should be made for meeting such emergencies.

The state boards to look after these activities would naturally be the Department of Health, the District Police, the State Board of Charities, and the Commission on Mental Diseases.

There would seem to be considerable work that would naturally fall to the activities of the Red Cross; such as caring for the sick, and furnishing nurses to the dependents. Much can be done by the charitable and social organizations, and all will expect much assistance from the local committees on public safety. These have expressed a willingness to help, and I am sure will freely coöperate when shown what they should do.

When confronted by a common danger, we have "agglutinated," but to show that we are not "paralyzed," a community council has been formed in the towns most likely to be affected, consisting of executive officers of each local board of health. Rules and regulations have been drawn up, approved by all, and are about to be legally adopted. A similar organization of the executive officers of the town selectmen has been formed, to consider uniform building by-laws and police regulations, and the heads of the various state departments mentioned have been in consultation, and are working in close coöperation. Headquarters for the State Department of Health have been secured in Ayer; the representatives of the other state departments will be furnished the necessary quarters with them, as will other official and semi-official organizations as far as possible. In thus grouping, we hope to be able to obtain still closer cooperation in the work. Good relations have been established with the army officers, that the federal and state officers may each be conversant with the activities of the other. Arrangements have been made with the Food and Drug Department to detail one of their chemists, and establish a laboratory at the Ayer headquarters. He will act as Inspector of Milk, as well as for Food and Drugs, with the assistance of the local officers in the community. An office force has been employed, and nurses have been consulted with, to supplement the work of the nurses already in the field, and who will be put to work in a few days. A comprehensive set of questions has been made out for a sanitary and social survey of the entire district, and work on this has already started. The state police have carefully looked the ground over, and have formulated plans for action.

While the task is a large and unusual one, we believe with the hearty coöperation that is manifest by all, it will be carried to a successful finish; and each official and individual will faithfully carry through the work assigned to him for the development of this division of the army, and to make Ayer and the surrounding towns larger

and better places on account of the establishment of Camp Devens in their midst.

INQUIRY BLANK.

Town of ———; Street or Road; Map number; Name of head of household; Owner of place.

For each member of household: Name, Age, Occupation, Place of occupation, Date of successful vaccination; What communicable diseases in the household in the past year, and date? Are all members of the household well at present?

Of what material are buildings built? State of repair? Water supply from well? Faucet from public supply? From private supply? Privy or cesspool? Condition and position in relation to house and water supply?

If producing foodstuff in excess of home use, what and where sold? Number of rooms in the house? What rooms could be let and rates a day? a week? Would meals be furnished? Rate? How many enlisted men would you be willing to entertain at your house for a day? For an evening meal? How often?

## MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.*

THE regular quarterly meeting of the Massachusetts Association of Boards of Health was held at the Pemberton Inn, Hull, Mass., on Thursday, July 26, 1917.

In the absence of the President, Dr. John S. Hitchcock, First Vice-President, took the chair.

It was voted to dispense with reading the minutes of the preceding meeting.

On recommendation of the Executive Committee the following applicants were admitted to membership in the Association: Dr. Charles H. Phillips, 221 Cabot St., Beverly, Mass.; Dr. Geo. T. O'Donnell, 768 Main St., Waltham, Mass.; Eugene S. Barry, Chairman, Board of Health, Ayer, Mass.

The following program was then presented:

"The Red Cross and Relief in Civilian Communities." Fred R. Johnson, Secretary of the Civilian Relief Committee of the Boston Metropolitan Chapter, American Red Cross.

"A Large Concentration Camp in Its Relation to a Civilian Community." Charles E. Simpson, M. D., District Health Officer, State Department of Health.

The meeting was adjourned.

F. H. SLACK, M. D.
*Secretary.*

*The expense of publication of the minutes and papers of this meeting are borne by the M. A. B. H.

# A GRAPHICAL STUDY OF THE EPIDEMIOLOGY OF POLIOMYELITIS.

T. G. Hull,
*Department of Public Health, American Museum of Natural History, New York.*

Received for publication February 4, 1917.

THE poliomyelitis epidemic of 1916 differed from previous outbreaks only in size; but the magnitude of the problem has stimulated investigation to an unprecedented degree. Most of the work on this disease, however, has been limited to the experimental studies of the laboratory, while the wealth of available epidemiological material remains almost untouched. The studies of the Massachusetts State Board of Health in earlier outbreaks and of the United States Public Health Service in the present one are brilliant exceptions. It seems likely that a detailed study from different viewpoints of the characteristics of poliomyelitis as it occurs in nature may throw important light upon the factors concerned in its causation. At the suggestion of Professor C.-E. A. Winslow, Curator of Public Health in the American Museum of Natural History, I have therefore undertaken such a study, which points clearly to the existence of three such factors, two of them well-known and a third, which has not so generally been recognized.

The results of this study can be presented best in graphic form with only brief necessary comment.

## The Epidemic Spread of the Disease.

The 1916 outbreak offers excellent evidence of the existence of the first factor concerned in the spread of poliomyelitis, viz., communicability. The epidemic began in Brooklyn, from which locality it quickly spread to the remainder of New York City and to New Jersey, the largest number of cases being reported in each of these places for the week of August 12, followed one week later by Connecticut and New York State, and by Pennsylvania in the week of August 26. From the peak in each case there was a more or less rapid decline. (See charts published in American Journal of Public Health, 1917, Vol. VII, p. 118.)

The mapping of the cases as reported by months in different states indicates that the disease is a communicable one and must have been carried mainly by human agencies, since it followed the routes of travel. In Connecticut the epidemic was confined chiefly to the main railroad line between New York and Boston. The epidemic passed from New York City in the form of a great wave, the territory first infected clearing up first.

The wave-like character of the epidemic is shown still better where the cases per 100,000 population are given by counties, and the counties plotted according to their distances from Brooklyn. The crest of the wave

progressed steadily across the state in New Jersey and also in New York. (See chart, American Journal of Public Health, 1917, Vol. VII, p. 119.)

It will be noticed that those counties more or less isolated from main routes of travel escaped with a very low incidence.

The fact that in the districts first affected (Brooklyn, the southeastern counties of New York and the northeastern counties of New Jersey) the diseases began to subside before it reached its maximum in the regions beyond strongly suggests the burning out of susceptible material in these communities and is in line with the view of Frost and others that in a severe outbreak of poliomyelitis practically the whole population is exposed to infection.

### The Factor of Season.

A second fundamental factor in the prevalence of this disease is its marked preference for the summer season. This is a puzzling phenomenon since all other diseases spread as poliomyelitis is believed to be spread, by the exchange of nose and throat secretions by human contact, are cold weather diseases. Professor Winslow has pointed out that a summer prevalence is suggestive of either an insect factor or an intestinal factor of some sort in the etiology of the disease.

The influence of season was very clearly shown in the 1916 epidemic. In the communities first affected the disease naturally decreased with the exhaustion of susceptible material; but even in the outlying districts where the epidemic broke out at a later date and could not have attained its maximum severity it dropped off in September with the onset of cool weather and practically disappeared in October. Chart 1, showing the incidence of the disease in five New Jersey counties, shows this very clearly. Essex and Passaic counties were severely affected early in August; Monmouth, not until late August; Atlantic and Gloucester counties, not until September; yet when cold weather came on the cases in the latter counties dropped off at once without ever reaching the maxima attained in the regions first attacked, and, apparently, before the available susceptible material could have been exhausted.

In order to see how far the principle of summer prevalence has held, I have studied the records of 52 epidemics, which have been reported during the past seventy-five years in different parts of the world. Chart 2 shows how generally the outbreaks have begun in the warmer months, though they have sometimes persisted through the fall. The detailed history of eleven typical epidemics is shown in Chart 3. The peak usually occurs in August or September with practically all the cases between the first of June and the last of November. A few small epidemics occurring in different localities have extended into the winter. In each one there is the usual summer rise and drop with a second rise in winter. The number of outbreaks and the number of cases in these outbreaks is so small in comparison with the others, however, that they do not materially affect the general conclusions brought out in Chart 3.

### Influence of Rainfall.

The fact that epidemics of poliomyelitis often occur during dry seasons has been occasionally noted and was strongly emphasized by Hill in the case of the Minnesota epidemic of 1909. In the course of my studies my attention was drawn to the fact that August, 1916, had the lowest rainfall recorded for that month in 46 years. In order to see whether this relation was in any sense a general one I have studied thirty-four epidemics (see Table I), the results being summarized in Table II. It will be seen that 76 per cent. of the epidemics began in deficiency months and in 29 per cent. the dry weather continued clear through. Twenty-four per cent. of the epidemics began in excess months, but in no instance did the wet weather continue clear through.

Chart 4, selected from the large series of outbreaks plotted, show the conditions which have generally obtained, although there have been a few exceptional instances of epidemics during wet seasons. Chart 5 brings out the broad relation between rainfall and the incidence in the epidemics for which full data were available.

TABLE I.

| *Locality and Year.* | *Cases.* | *Month.* | *Precipitation.* | | |
|---|---|---|---|---|---|
| | | | (mm.). | Departure from normal. | |
| Stockholm, 1887, | | Aug. | 44. | -29. | + |
| | | Sept. | 60. | | 18. |
| | | | (*in.*) | | |
| Poughkeepsie, N. Y., 1899, | | July | 5.56 | | 1.29 |
| | | Aug. | 1.68 | 2.93 | |
| North Adams, Mass., 1894, | | Aug. | 6.09 | | 1.7 |
| | | Sept. | 2.20 | .8 | |
| | | | (mm.) | | |
| Stockholm, 1895, | | June | 25. | 14. | |
| | | July | 114. | | 51. |
| | | Aug. | 72. | 1. | |
| | | Sept. | 41. | 1. | |
| Trondhjem, Norway, 1905, | | Apr. | 53. | | 10. |
| | | May | 36. | | |
| | | June | 47. | | 6. |
| | | July | 117. | | 52. |
| | | Aug. | 116. | | 28. |
| | | Sept. | 55. | 23. | |
| | | Oct. | 65. | 28. | |
| Vienna, 1897, | | June | 79. | 5. | |
| | | July | 206. | | 128. |
| | | Aug. | 39. | 23. | |
| | | Sept. | 42. | | |
| | | Oct. | 51. | | |
| | | Nov. | 11. | 21. | |
| Stockholm, 1899, | | July | 49. | 14. | |
| | | Aug. | 23. | 50. | |
| | | Sept. | 115. | | 73. |
| | | | (in.) | | |
| Gloucester, Mass., 1900, | | June | 1.85 | 1.2 | |
| | | July | 2.69 | .8 | |
| | | Aug. | 2.46 | 2.0 | |
| | | Sept. | 4.62 | | 1.7 |
| Ridgeway, Pa., 1907, | | July | 1.32 | 3.69 | |
| | | Aug. | 1.37 | 2.59 | |
| | | Sept. | 5.55 | | 2.16 |

| *Locality and Year.* | *Cases.* | *Month.* | *Precipitation.* | | |
|---|---|---|---|---|---|
| | | | | Departure from normal. | |
| | | | (in.) | − | + |
| New York, N. Y., 1907, | | July | .89 | 3.6 | |
| | | Aug. | 3.24 | 1.3 | |
| | | Sept. | 8.33 | | 4.6 |
| | | Oct. | 4.78 | | .9 |
| San Francisco, 1901, | | May | .69 | .1 | |
| | | June | .00 | .2 | |
| Cherryfield, Me., 1896, | | July | 6.05 | | 3.0 |
| | | Aug. | 2.90 | .6 | |
| New York, N. Y., 1897, | | June | 2.98 | .3 | |
| | | July | 9.52 | | 5.0 |
| | | | (mm.) | | |
| Saint Foy, France, 1885, | | June | 21. | 44. | |
| | | July | 9. | 70. | |
| St. Girons, France, 1894, | | July | 4. | 8. | |
| | | Aug. | 1. | 25. | |
| Vermont, 1894, | | July | 1.57 | 1.2 | |
| | | Aug. | 1.49 | 2.5 | |
| | | Sept. | 2.88 | .5 | |
| | | | (mm.) | | |
| Umea, Sweden, 1881, | 18 | July | 55.4 | 1.5 | |
| | | | (in.) | | |
| Vermont, 1915, | 9 | Aug. | 2.88 | .9 | |
| | 13 | Sept. | .97 | 3.0 | |
| | 10 | Oct. | 2.74 | .5 | |
| Newark, N. J., 1916, | 197 | July | 3.44 | 1.1 | |
| | 503 | Aug. | .59 | 4.0 | |
| | 89 | Sept. | 2.98 | .6 | |
| Franklin County, Mass., 1908, | 6 | June | 2.7 | .4 | |
| | 28 | July | 2.0 | 1.6 | |
| | 26 | Aug. | 3.7 | .2 | |
| | 5 | Sept. | .3 | 2.4 | |
| Los Angeles, Cal., 1912, | 19 | June | 0.0 | .10 | |
| | 129 | July | 0.0 | .02 | |
| | 89 | Aug. | 0.0 | .03 | |
| Vermont, 1914, | 8 | July | 1.94 | 1.8 | |
| | 88 | Aug. | 2.78 | 1.2 | |
| | 142 | Sept. | 2.36 | 1.0 | |
| | 56 | Oct. | 1.10 | 2.1 | |
| Boston, Mass., 1893, | 8 | Aug. | 6.5 | | 3.2 |
| | 11 | Sept. | 1.6 | 2.4 | |
| Westfalen, 1909, | 9 | June | 64. | 4. | |
| | 28 | July | 114. | | 24. |
| | 57 | Aug. | 104. | | 21. |
| | 75 | Sept. | 92. | | 32. |
| | 147 | Oct. | 57. | 10. | |
| | 42 | Nov. | 72. | | 21. |
| | | | (in.) | | |
| Seattle, Wash., 1910, | 32 | Aug. | .17 | 32. | |
| | 32 | Sept. | 1.04 | 89. | |
| | 15 | Oct. | 4.02 | | 1.14 |
| Buffalo, N. Y., 1912, | 9 | June | .83 | 2.31 | |
| | 68 | July | 1.41 | 1.99 | |
| | 110 | Aug. | 4.00 | | 1.01 |
| | 74 | Sept. | 3.31 | | .13 |
| | 16 | Oct. | 4.25 | | .72 |
| Mason City, Iowa, 1910, | 5 | May | 2.32 | 2.34 | |
| | 14 | June | 1.20 | 4.69 | |
| | 17 | July | .71 | 3.35 | |
| | 3 | Aug. | 4.84 | | 1.24 |
| Stockholm, 1911, | 19 | May | 6. | 29. | |
| | 23 | June | 23. | 16. | |
| | 11 | July | 34. | 29. | |

| *Locality and Year.* | *Cases.* | *Month.* | *Precipitation.* | | |
|---|---|---|---|---|---|
| | | | (mm.) | Departure from normal. | |
| Stockholm, 1911—*Cont'd,* | 24 | Aug. | 32. | −41. | + |
| | 57 | Sept. | 40. | 1. | |
| | 32 | Oct. | 65. | | 6. |
| | 17 | Nov. | 78. | | 39. |
| | | | (in.) | | |
| Minnesota, 1909, | 7 | June | 3.5 | .7 | |
| | 26 | July | 3.84 | .48 | |
| | 58 | Aug. | 4.54 | | 1.15 |
| | 99 | Sept. | 3.16 | .25 | |
| | 87 | Oct. | 1.56 | .82 | |
| | 21 | Nov. | 2.68 | | 1.83 |
| | 10 | Dec. | 1.54 | | .77 |
| Cincinnati, Ohio, | 5 | Aug. | 3.06 | 0.27 | |
| | 44 | Sept. | 7.52 | | 5.21 |
| | 92 | Oct. | 4.54 | | 2.22 |
| | 17 | Nov. | 2.92 | .29 | |
| | | | (mm.) | | |
| Jönköping's Co., Sweden, 1911, | 49 | July | 56.9 | | 2. |
| | 414 | Aug. | 39.9 | 40. | |
| | 313 | Sept. | 29.2 | 15. | |
| | 132 | Oct. | 95.7 | | 55. |
| Älfborg's Co., Sweden, 1911, | 34 | July | 45.8 | 24. | |
| | 106 | Aug. | 37.5 | 78. | |
| | 103 | Sept. | 53.9 | 7. | |
| | 32 | Oct. | 139.4 | | 42. |
| | | | (in.) | | |
| Nebraska, 1909, | 143 | July | 3.9 | | .4 |
| | 137 | Aug. | 2.0 | 1. | |
| | 53 | Sept. | 2.9 | .7 | |
| | 20 | Oct. | 1.1 | .5 | |
| New York, N. Y., 1916, | 313 | June | 3.98 | | .68 |
| | 3443 | July | 3.44 | 1.1 | |
| | 3927 | Aug. | .59 | 4.0 | |
| | 985 | Sept. | 2.98 | .6 | |
| | 258 | Oct. | .63 | 3.0 | |

TABLE II.

| | |
|---|---|
| Total number of epidemics | 34 |
| Epidemics starting in deficiency months | 26 |
| Epidemics starting in excess months | 8 |
| Epidemics occurring entirely in deficiency months | 10 |
| Epidemics occurring entirely in excess months | 0 |
| Total number of months | 123 |
| Number of deficiency months | 82 |
| Number of excess months | 38 |
| Number of months with no change | 3 |

Of these 34 epidemics only 18 were sufficiently well reported so that the number of cases by months could be determined. These 18 were studied as to the number of cases occurring in the deficiency and excess months.

TABLE III.

| | |
|---|---|
| Total number of epidemics | 18 |
| Total number of months | 73 |
| Number of deficiency months | 51 |
| Number of excess months | 22 |
| Total number of cases reported | 13,365 |
| Cases occurring in deficiency months | 11,994 |
| Cases occurring in excess months | 1,371 |

Although only 70 per cent. of the months were deficient in rainfall, 90 per cent. of all the cases occurred during dry seasons.

The relation between the number of cases and the amount of dryness is quite pronounced. In those months when the deficiency of rainfall amounted to 3 to 5 inches, 36 per cent.

of all the cases occurred, 1 to 3 inches deficiency—35 per cent. of the cases, 0 to 1 inch more than 17 per cent. of the cases.

## Summary.

From the charts, maps and tables given the following conclusions concerning past epidemics of poliomyelitis may be drawn:

(1) The disease follows the main routes of travel, indicating that it is probably carried by human agencies. (2) It spreads in waves over the country, the crest progressing steadily away from the focus. This suggests that in severe outbreaks practically everyone is exposed and, after all the susceptibles have been stricken, the epidemic subsides. (3) The seasonal prevalence is quite marked, the large majority of cases occurring between the first of June and the last of November. In the southern hemisphere the seasons are reversed, the epidemics occurring between the first of December and the last of May. (4) Out of 34 epidemics occurring during the last 75 years, 76 per cent. began in months of deficient rainfall and in 29 per cent. of them the dry weather lasted clear through. Twenty-four per cent. of the epidemics began in excess months and in none did the wet weather continue clear through.

In 18 epidemics with a total of 13,365 cases practically 90 per cent. of the cases occurred during deficiency months. The dryer the weather, the greater, in general, has been the number of cases.

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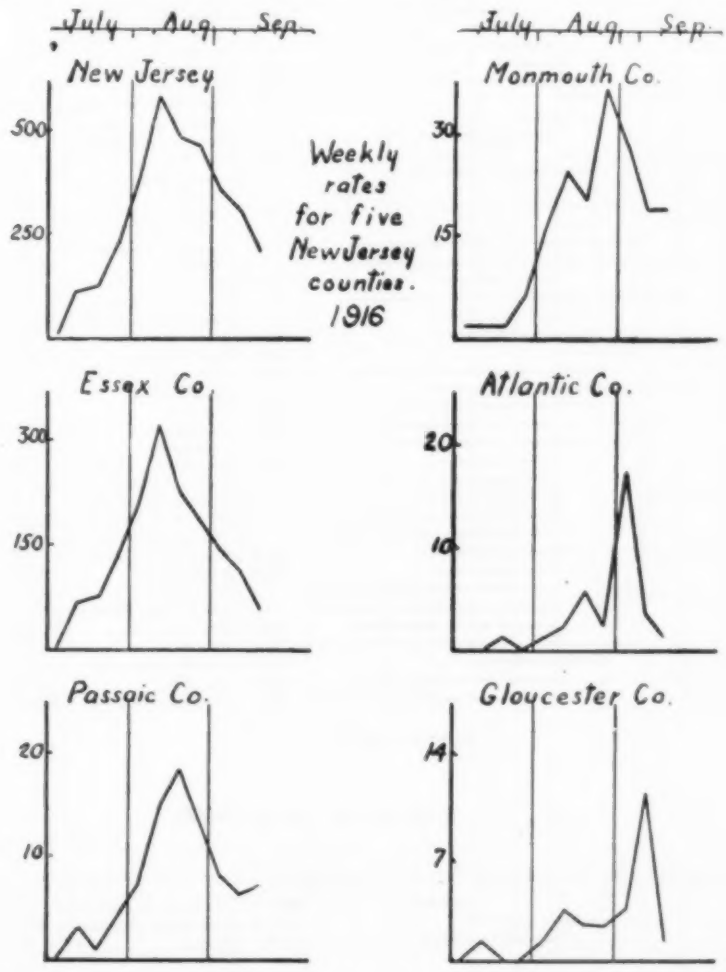


CHART 1. Weekly rates of poliomyelitis for five New Jersey counties, showing how the disease progressed in a wave across the state (Essex, Passaic, Monmouth, Atlantic, Gloucester), and the burning up of susceptible material. When cool weather came on, the epidemic subsided without reaching the maxima attained in the regions first attacked and apparently before all available susceptible material could have been exhausted.

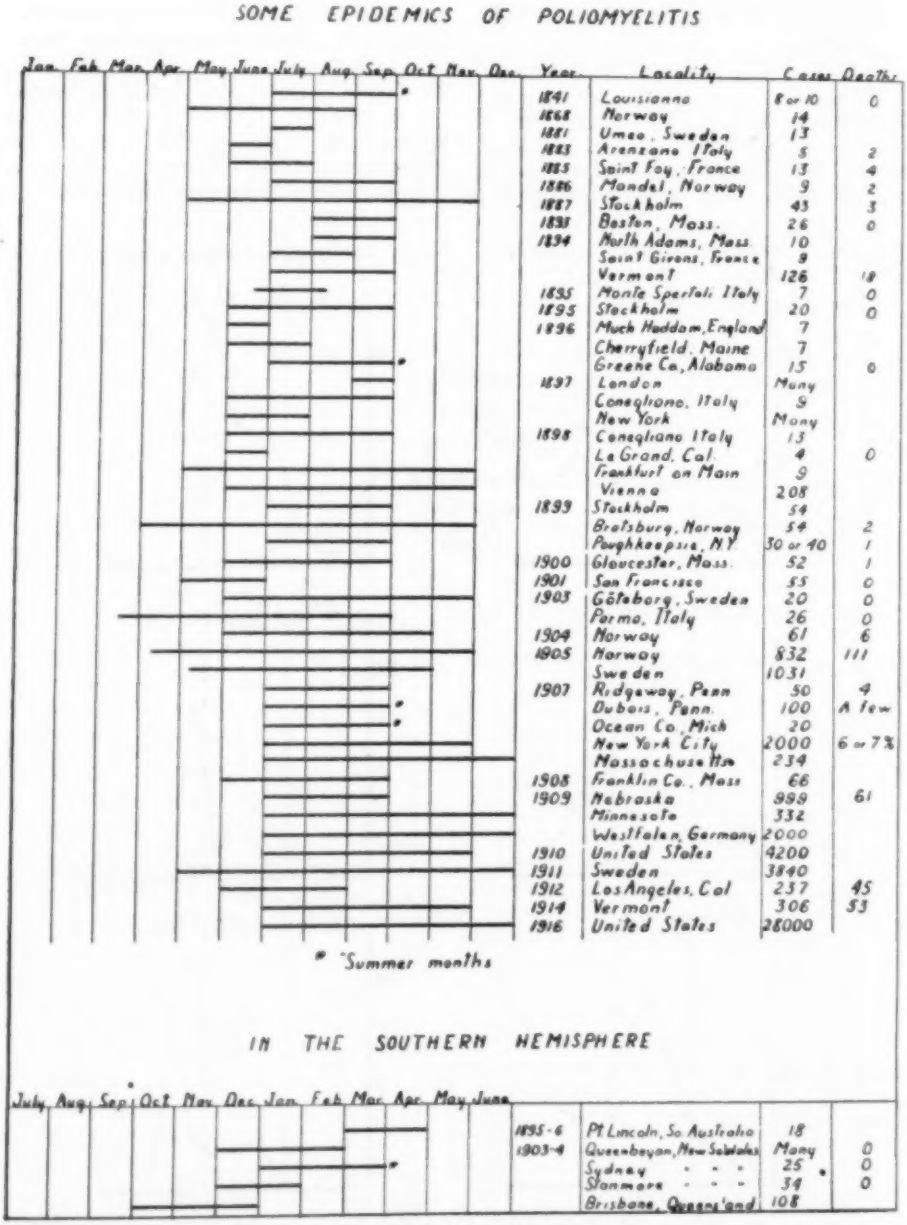
SOME EPIDEMICS OF POLIOMYELITIS
Jan. Feb. Mar. Apr. May. June. July. Aug. Sep. Oct. Nov. Dec.
Year. Locality. Cases. Deaths.
1841 Louisianna 8 or 10 0
1868 Norway 14
1881 Umea, Sweden 13
1883 Arenzano Italy 5 2
1883 Saint Foy, France 13 4
1886 Mandal, Norway 9 2
1887 Stockholm 43 3
1831 Boston, Mass. 26 0
1834 North Adams, Mass. 10
Saint Girons, France 9
Vermont 126 18
1835 Monte Sperfali Italy 7 0
1895 Stockholm 20 0
1836 Much Haddam, England 7
Cherryfield, Maine 7
Greene Co, Alabama 15 0
1837 London Many
Conegliono, Italy 5
New York Many
1898 Conegliano Italy 13
La Grand, Cal. 4 0
Frankfurt on Main 9
Vienna 208
1839 Stockholm 54
Brofsburg, Norway 54 2
Poughkeepsie, N.Y. 30 or 40 1
1900 Gloucester, Mass. 52 1
1901 San Francisco 55 0
1903 Göteborg, Sweden 20 0
Parma, Italy 26 0
1904 Norway 61 6
1905 Norway 832 111
Sweden 1031
1907 Ridgeway, Penn 50 4
Dubois, Penn. 100 A few
Ocean Co, Mich 20
New York City 2000 6 or 7%
Massachusetts 234
1908 Franklin Co., Mass 66
1909 Nebraska 999 61
Minnesota 332
Westfalen, Germany 2000
1910 United States 4200
1911 Sweden 3840
1912 Los Angeles, Cal 237 45
1914 Vermont 306 53
1916 United States 28000
* Summer months
IN THE SOUTHERN HEMISPHERE
July. Aug. Sep. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May. June.
1895-6 Pt Lincoln, So. Australia 18
1903-4 Queanbeyan, New Soth Wales Many 0
Sydney " " " 25 0
Stanmore " " " 34 0
Brisbane, Queensland 108

CHART 2. Records of fifty-two epidemics of poliomyelitis showing the prevalence in the warmer months.

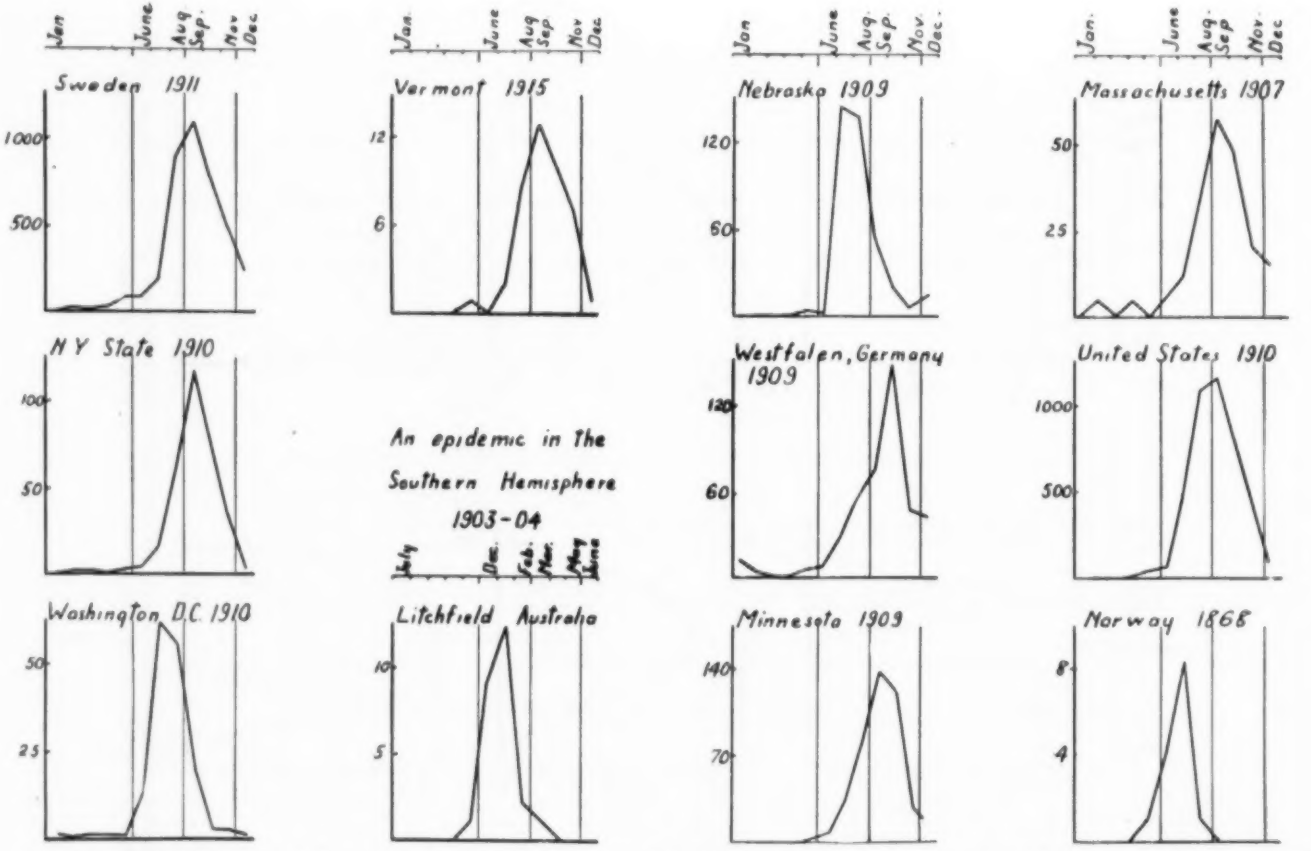


CHART 3. Detailed history of eleven typical outbreaks of poliomyelitis showing how the peak usually occurs in August or September, with all the cases between the first of June and last of November. (Southern Hemisphere first of December and last of May.)

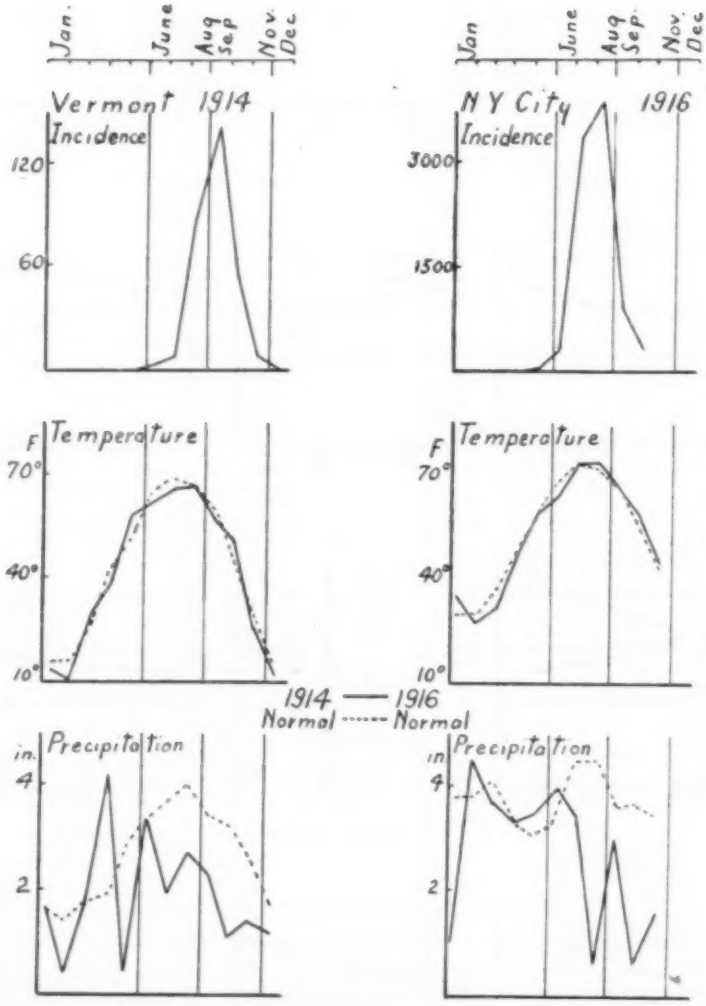


CHART 4. Relation of incidence of poliomyelitis to temperature and rainfall. Note the deficiency of rainfall during the height of the epidemics. This is typical of the large majority of epidemics.

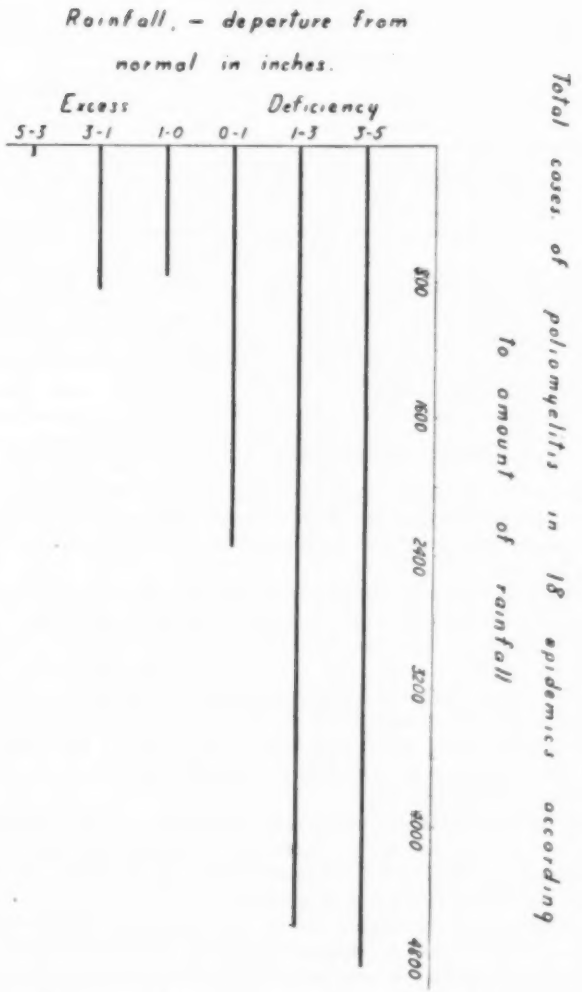


CHART 5. Relation between rainfall and incidence of poliomyelitis, showing how 11,994 cases or 90 per cent. of the total occurred during months of deficient rainfall, as against 1,371 cases in months of excess rainfall. In general, the dryer the weather in epidemics, the greater the number of cases.

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## THE WAR MEETING AT WASHINGTON.

Astride of the ever extending realization by the people of the value of hygienic living has come the realization by all of the necessity of hygienic fighting, and the continued maintenance of the high standard of health of the civil population during the war period.

We have as a nation little personal experience of the application of the modern principles of public health practice to a concentrated armed force of hundreds of thousands. We have as a nation still less experience in the maintenance of a high standard of health among the civil population at home during war; a standard which cannot help but be undermined at first by unfortunate withdrawal of health supervision and short-sighted diminution of appropriation.

But we as a nation must offset our lack of experience and the slight, though certain—and thus dangerous—tendency towards the decrease of health supervision among the civil population.

The Forty-fifth Annual Meetings of the American Public Health Association are to take place at a time when the country is in peculiar need of education, of practical experience, and of constant and serious appreciation of what the country must have—health, at home and abroad.

What a splendid service to this country the American Public Health Association can render at this time: A congress of health workers, drawn together for a great and common purpose; a congress led by military and civil health authorities; a congress convened to learn and to afterward apply public health practice on a war basis!

What a splendid service to the country the members of the Association and their non-member associates can render by attending these meetings, and by disseminating the knowledge and experience shared by them throughout the country!

The people and community require this knowledge and your consideration. Your conscience should demand your attendance.

Mere writing cannot influence you beyond a certain point; true appreciation

of the problems ahead should. Closely study the program published with this issue. Note the nature of the discussions and papers to be presented. And then look at the men behind those discussions and papers, men of world and nation-wide authoritativeness; the few men who can instruct the many.

Members, we have a mighty lever in our hands today. Can your country and Association depend upon you to take advantage of its powerful possibilities?

A. D. H.

## HEALTH PROTECTION AFTER THE WAR.

In a recent address, President Lowell of Harvard University said that, although we had not prepared for war, we would have no excuse, if, during war, we did not prepare for peace. This applies to public health, as well as to international relations, and the problem is not easy.

The object of war is the achievement of victory, and the health of the soldier is but an incident to that end. When disability on account of wounds or disease cannot be rapidly overcome, the soldier must be discarded, to carry his wounds or his diseases back to his family and his friends.

Reports show that the increase in tuberculosis and venereal diseases in the European armies is appalling. The organizations at work against tuberculosis at the front and venereal diseases behind the trenches will do valuable service, but it would be folly not to admit that, notwithstanding this work, these diseases will increase among our soldiers abroad. So we must consider how we can protect the victims against the late manifestations of their disease, and the folks at home against becoming infected.

First of all, every health organization in the country should be urged to prepare for more difficult work caused by new conditions, and no preparation, we may be sure, will be greater than the demand. The problem is, however, primarily a federal one caused by a national war, and the central government should take the lead.

To protect the world from epidemic diseases that have from time to time been present in our ports the United States Public Health Service originated and has successfully enforced what is now known as "out-going quarantine," and it is believed that this should now be applied to all persons returning to this country from the front. In other words, let the person infected with any contagious disease be quarantined in the country where the infection was contracted until the infectious stage has passed.

The logical way to limit infection is to prevent its leaving a given place, rather than to guard uninfected places. This is the acknowledged method in dealing with acute contagious diseases and may, under the present circumstances, be applied to such chronic diseases as tuberculosis and venereal diseases. It would be necessary for outgoing quarantine stations with complete hospital facilities to be established in one or more French ports, through which all returning to America would be required to pass. Those infected would be detained and treated with the sole object of making them no longer dangerous to others. The effort would be made to convert open tuberculosis into a non-communicable type, failing which, the patients would be sent home under special precautions. Those with syphilis and gonorrhœa would be held and treated until harmless to others. This would be entirely possible, if done at a foreign port. If attempted on this side after the arrival of returning transports, it would be well nigh impossible, on account of the impatience and curiosity of waiting friends. If our

"Sammy" is booked to return and delays occur at the port of embarkation, who knows why and who cares, so long as he comes back well?

Outgoing quarantine is a logical procedure and has been used with complete success to protect the world against our plague and yellow fever. In the hands of the United States Public Health Service or one equally efficient, and with the coöperation of our ally on whose soil our boys are fighting, the method above outlined would do much to protect us against war bred tuberculosis and venereal disease.

S. B. G.

## THE HEALTH OFFICERS' RESERVE BILL IN DANGER.

Early in May of this year a resolution was passed by the Conference of State and Provincial Health Officials in favor of creating a National Sanitary Reserve to the United States Public Health Service. As Senate Joint Resolution 63 this promptly passed the Senate. Thence it went to the House and was referred to the Committee on Interstate and Foreign Commerce, in whose hands it lay until August 30, when it finally emerged, somewhat altered, but still useful. At this writing (Sept. 24th), the bill has not yet passed the House. Meanwhile, Congress faces adjournment. Unless influence is brought to bear—and that quickly—it is likely that the Sanitary Reserve Bill will quietly die as the session ends.

The nature of this bill is referred to on pages 560, 673, and 794 of the present volume of the JOURNAL. It has the unanimous support of health authorities in the land: state health officers, the Surgeon-Generals, the Council of National Defense, and others. It is not a political deal, but a war measure of the highest importance. That such a measure of undoubted merit can be held up four months is a reflection upon our legislative methods.

Every sanitarian who loves his country and respects his profession should immediately write—or better—telegraph his Congressman, urging the passage of the Sanitary Reserve Bill. Publish your views in your health bulletins and newspapers, and send marked copies to Congressmen. The most intense activity is necessary as Congress may adjourn in a few days.

A. W. H.

## VENEREAL ADVERTISEMENTS.

The bill prohibiting so-called "quack" advertising, introduced on behalf of the New York Social Hygiene Society and passed by the last session of the legislature at Albany, places New York State abreast of our more progressive western states that have enacted similar legislation. This law makes it a misdemeanor for anybody, except boards of health and licensed hospitals and dispensaries, to advertise in any way concerning venereal diseases or other sexual ailments. Penalty for violation of this law is fixed at from fifty to five hundred dollars fine or imprisonment for a term not to exceed six months, or both such fine and imprisonment.

This means that all newspaper, sporting-journal, toilet room and other advertising of this nature must go and that young fellows will no longer be misinformed or so readily mistreated and fleeced by these "specialists." By thus ridding the regular advertising channels of this class of scare-heads and lying promises, the way is cleared for a more aggressive and effective educational advertising campaign on the part of wideawake health departments and dispensaries and, through them, social hygiene organizations.

# THE EFFECT OF ATMOSPHERIC CONDITIONS UPON FATIGUE AND EFFICIENCY.

C.-E. A. WINSLOW,
*Professor of Public Health, Yale Medical School, and Chairman New York State Commission on Ventilation.*

Read before the Industrial Hygiene Section at Cincinnati, Ohio, October 25, 1916.

THE fitting together of the man and the job is one of the most important problems of modern industry. A correct solution requires on the one hand a study of the task with a view to such modifications as may make it easier of performance; and on the other hand, as Professor Lee has pointed out, a careful consideration of the physiological machine and its capabilities, with constant reference to the time for which the work is to be continued as a factor in securing efficient performance with a minimum of fatigue.

Fatigue and efficiency depend, however, not merely on the man and the task but also on the conditions under which the task is performed, and those which have affected the worker during a preceding period. The potentialities of a given workman on a given day will be influenced by the meals he has eaten on the day before, by the exercise he has taken, by his hours of sleep and by his frame of mind when he comes to work. His actual performance will be largely controlled by the atmospheric conditions and lighting of the workroom, by its physical order and its psychological atmosphere.

I desire in this discussion to call your attention to the great but commonly unrecognized importance of one of these environmental factors in efficiency, the physical condition of the atmosphere of the workroom.

Our knowledge of the relation between air and health has made remarkable and almost revolutionary progress during the past twenty years. In 1896 the Smithsonian Institution published a brochure upon "The Atmosphere in Relation to Human Life and Health," by F. A. R. Russell, Vice-President of the Royal Meteorological Society and Fellow of the Sanitary Institute of Great Britain, which is a good example of the unfounded opinions which so recently ruled in this field of sanitary science. The emphasis is wholly chemical and bacteriological. "The deficiency of oxygen and excess of carbonic acid, which are common to nearly all rooms, schools, churches, theaters, and workshops where many persons are gathered, are very favorable not only to the spread of various infectious diseases, but to the maintenance of a number of minor ailments; and where the exposure to foul air is prolonged, as in workshops, offices, and mills, to a continued depression of vitality," says Mr. Russell. And again, "The spreading, infectious, or epidemic diseases in the animal

world and in mankind depend to a very great extent upon aerial influences."

Much water has passed under the bridges since 1896. We know today that

1. The changes in oxygen and carbon dioxid content which take place in the worst ventilated schools, theaters and work places which have ever been studied (excepting bottling works, breweries and other places where carbon dioxid is formed or used in the industrial process itself) are of a magnitude far too small to exert any harmful physiological effects whatever.

2. The organic substances which give a stale odor to the air of crowded rooms may perhaps exert a reflex effect on appetite and hence on the consumption of food, but otherwise they have not been shown to be poisonous or to exert any harmful effect. The liberation by industrial processes or imperfect combustion of poisonous gases and fumes such as carbon monoxid or wood alcohol may, however, be of serious importance in special cases.

3. The air is not a carrier of disease germs except in so far as it may be locally polluted by considerable clouds of infected dust or by the spray discharged from the mouth in coughing, sneezing or loud speaking for a few feet in front of an infected person.

4. Hard metallic or mineral dusts such as are produced in many industrial processes constitute a very real danger to health from their injurious mechanical effects upon the respiratory tract which definitely favor the development of tuberculosis and other respiratory infections.

5. The most far-reaching and important influences of the atmosphere upon health are due not to chemical or bacteriological factors but to the physical condition of the atmosphere itself. The sensations experienced in a badly ventilated room and the serious effects which such a room exerts upon health and efficiency are primarily due to the warmth and stagnation of the air and to its high humidity. The phenomenon, as Professor Lee has so well said, is "physical and cutaneous, not chemical and respiratory"; overheating is the most serious aspect of underventilating.

It seems strange today that sanitarians should have gone so far afield in the search for mysterious organic emanations, "anthropotoxin" and "morbific matter," when the thermal explanation of the effects of bad air lay so close at hand.

The well known influences of climate and season furnish broad and telling evidence of the influence of temperature on human efficiency. Prof. Ellsworth Huntington, in his remarkable book on "Civilization and Climate," has made a detailed study of the development of civilization in different parts of the world in relation to climatic conditions and finds a striking correspondence. His ideal climate is one with an average mean temperature of 15° C. (59° F.), and a range between a mean of −7° C. (19° F.) for the coldest month and 23° C. (73° F.) for the warmest month, and at least twenty storms a year, giving coolness combined with the stimulus of change. The areas where we should expect human energy to reach a maximum

according to this criterion are western Europe and eastern North America, with Central Europe, more western North America, Japan, New Zealand and the tip of southern South America next in order. With the exception of the latter region, for which the climatological data are imperfect, these are precisely the points where civilization reaches its highest point, while the warmer countries and the very cold countries form belts of retarded human development.

Professor Huntington's studies of the effect of season upon the productivity of industrial workers provide evidence which is even more significant and more directly in line with the subject which we have immediately in hand. He obtained detailed information as to the weekly earnings of operatives employed on piece work in Connecticut and Pittsburg factories, in North Carolina and Georgia cotton mills, and in carpenter shops and cigar factories in Florida. None of the trades were essentially seasonal in nature, yet the curves show in practically every case two maxima of efficiency in spring and fall with minima in winter and summer. In the north the winter decline is very marked and that in summer less noticeable. In North Carolina and Georgia the two minima are about equal; while in Florida the winter decline is insignificant and that of summer very clearly marked. A mean outdoor temperature of 15.5° to 18° C. (60° to 65° F.) seems in all cases to be most favorable for maximum industrial efficiency.

These figures it should be noted relate to general outdoor conditions, not to those which exist in the factory itself. Still more direct evidence of the immediate relation between air temperature and efficiency is furnished by the experiments which have been carried on by the New York State Commission on Ventilation during the past thee years.

In these investigations over a hundred different subjects, both men and women, were placed for periods approximating a day or a half day of factory work under accurately controlled atmospheric conditions, maintained in specially constructed experimental rooms at the College of the City of New York. They were given physical and mental tasks of various kinds and in some experiments they were served a standard luncheon while in the rooms and their appetite measured by the amount of food eaten. Exhaustive physiological and psychological observations were made of their bodily condition and their efficiency in both mental and physical work was accurately measured.

These experiments showed that stale re-breathed air containing 20 parts or more of carbon dioxid and all the organic and other substances commonly present in such air had no harmful effect on any of the physiological conditions studied, nor on the power or inclination to do mental or physical work, nor even on the comfort of the subjects as indicated by their average vote,—provided the temperature was not allowed to rise as it would generally do in such a room under ordinary conditions. There was, however, a slight but distinct diminution in the appetite for food in the stale air.

On the other hand warm air, whether stale or fresh, produced distinct and clearly marked physiological reactions. At a temperature of 24° C. (75° F.) with 50 per cent. relative humidity the rectal body temperature was .2° C. higher and at a temperature of 30° C. (86° F.), with 80 per cent. relative humidity, it was .5° C. higher than at 20° (68° F.) with 50 per cent. relative humidity. The reclining pulse rate was 5 beats higher and the standing pulse rate 12 beats higher at 24° C. (75° F.) the reclining pulse rate 8 beats higher and the standing pulse rate 17 beats higher at 30° C. (86° F.) than at 20° (68° F.) The systolic blood pressure was not affected at 24° C. but was decreased by 2 mm. reclining and by 7 mm. standing at 30°. The diastolic blood pressure, reclining, was 5 mm. lower at 24° and 10 mm. lower at 30°, while the figure for the standing position was the same at 20° and 24° but was 7 mm. lower at 30°. The Crampton value, an index of the general tone of the vaso-motor system obtained from the relation between the change in blood pressure and heart rate on passing from a reclining to a standing posture was 58 at 20° C., 53 at 24° and 36 at 30°, indicating a progressively less efficient condition of the circulation with increasing temperature.

The power to do either mental or physical work when concentrating for a short period under a strong stimulus was not diminished in these experiments even by the extreme condition of 30° C. (86° F.) with 80 per cent. relative humidity. This coincides with practical experience, for we are all aware that heat, unless very extreme, is no hindrance to absorbing intellectual work and no bar to a good game of tennis.

The effect of heat upon efficiency, unless the influence is a prolonged one, is exercised rather upon the will than on the power to work. Our subjects in some cases were asked each day to vote as to the comfort of the conditions in the experimental room on a scale of five points ranging from 1—very uncomfortable to 5—very comfortable. The average votes for five such experiments are indicated below.

AVERAGE COMFORT VOTES UNDER DIFFERENT ATMOSPHERIC CONDITIONS.

| Room temperature | | Relative humidity | Comfort vote | | | | |
|---|---|---|---|---|---|---|---|
| C. | F. | | Series I | II | VI | VII | VIII |
| 10° | 50° | 50% | ... | ... | ... | ... | 3.4 |
| 20 | 68 | 50% | 3.8 | 4.2 | 4.1 | 4.7 | 4.1 |
| 24 | 75 | 30% | ... | ... | ... | ... | 3.9 |
| 24 | 75 | 50% | ... | ... | 4.1 | 4.6 | ... |
| 24 | 75 | 80% | ... | ... | ... | ... | 3.0 |
| 30 | 86 | 30% | ... | ... | ... | ... | 2.8 |
| 30 | 86 | 80% | 2.8 | 3.6 | ... | ... | 2.6 |

It will be noted that in each series the 20° condition was most appreciated and the warmer and more humid atmospheres became progressively uncomfortable. The difference between 20° and 24° was scarcely appreciable, however, in these records of conscious discomfort. Yet even this range of temperature produced a distinct difference in the demeanor. At 20° our observers' notes are full of such qualifying phrases as "playful, energetic, good work, inclined to 'rough house,' hard to control, less drowsiness than usual"; while at 24° we find such notes as the following; "sleepy, eyes smarted, less inclination to work, lifeless, drowsy, more conversation than usual."

The real effects of air temperature upon efficiency were brought out by a series of "option tests," in which the subjects for a given period were given a choice between physical or mental work on the one hand and idling on the other, receiving a small cash bonus if they did the work. This is a condition which approximates the actual conditions of school and industrial life, in furnishing a real but not an overmastering stimulus to effort, with the alternative possibility of taking life more or less easily.

Even this form of option test did not disclose any harmful effect of the 24° C. (75° F.) condition on purely intellectual work such as mental multiplication. On the contrary the average of three series of experiments with 47 different male and female subjects, extending over a period of 16 weeks, showed that 4.9 per cent. *more* mental multiplication was done at 24° than at 20°. It may be that work of this kind offered a certain distraction under slightly uncomfortable conditions; and it is also

TABLE SHOWING INCLINATION TO DO VARIOUS KINDS OF MENTAL WORK AND TYPEWRITING AT DIFFERENT TEMPERATURES. ALL WORK OPTIONAL.

(Series V, 4 subjects, 6 days. Summer.) Conditions below are in order of occurrence.

| | 30° 86° F. | 24° 75° F. | 20° 68° F. | 24° 75° F. | 30° 86° F. | 20° 68° F. |
|---|---|---|---|---|---|---|
| Mental multiplication. Number of problems done times 10. (Score.) Total all subjects | 583 | 1,295 | 1,495 | 1,550 | 1,341 | 1,930 |
| Percentage of error to mental multiplication score | 1.26% | 1.19 | 0.71 | 0.57 | 0.65 | 0.54 |
| Typewriting. Number of lines times 10. Total all subjects | 1,085 | 1,692 | 2,215 | 585 | 290 | 1,358 |

possible that the subjects found the 20° condition somewhat too cool for purely sedentary work. It may be noted however that when the temperature was changed abruptly in the middle of the day slightly more mental multiplication was done at 20°. In one series in which a temperature of 30° was also used we obtained the results tabulated below, which are of interest as showing a steady improvement in all tasks during the first three days due to practice and to improving temperature conditions. On the fourth day with a temperature of 24° mental multiplication continued to improve with practice, but typewriting fell off, and on the fifth day a rise to 30° caused a falling off in all the tasks, with subsequent improvement on return to 20° on the sixth day.

In all our experiments typewriting, which involves some muscular work, was clearly and unfavorably affected by even a moderate rise in temperature. The table below shows in detail the results as to both mental multiplication and typewriting for three series of experiments. The general average shows as noted above an excess of 4.9 per cent. in mental multiplication at 24° for all series. On the other hand the average amount of typewriting done was 6.3 per cent. greater at the cooler temperature. Both the increase in mental multiplication and the decrease in typewriting at 24° were much more marked when the change in temperature was made in the middle of the day than when the cool and the warm conditions were continued for three to five days at a time.

TABLE SHOWING PRODUCT PRODUCED IN MENTAL MULTIPLICATION AND TYPEWRITING AT DIFFERENT TEMPERATURES WHEN THE WORK IS PERFORMED AT THE OPTION OF THE SUBJECT.

(Figures below are the scores obtained. The score is based on quantity of work done with an allowance for quality of the work.)

| Series | Test | 68° Half day | 75° Change | 68° Three day | 75° Change |
|---|---|---|---|---|---|
| VI. 16 men. 4 weeks. Stagnant air | Mental multiplication | 85.8 | 80.5 | 51.1 | 87.4 |
| | Typewriting | 324.3 | 215.7 | 371.9 | 450.3 |
| VIII. 16 men. 4 weeks. Stagnant air | Mental multiplication | 200.8 | 212.7 | 183.2 | 190.5 |
| | Typewriting | 189.4 | 169.5 | 330.9 | 304.0 |
| XIV. 15 women. 8 weeks. Air supply | Mental multiplication | 147.7 | 139.6 | 52.6 | 64.5 |
| | Typewriting | 289.5 | 267.3 | 302.9 | 306.0 |
| | Addition | 154.0 | 155.5 | 123.1 | 123.3 |

Mental multiplication is a type of pure concentrated intellectual work which has no analogue in the ordinary affairs of daily life. Typewriting on the other hand is fairly typical of most office work which involves a fair proportion of light muscular activity. That the amount of such work performed was 6.3 greater at 20° (68° F.) than at 24° (75° F.) seems a highly significant fact.

very common in industrial plants is made clear by numerous observations. Thus in the Reports of the Commissioner of Labor of New York State for 1908, 1909 and 1910 there are recorded temperatures observed in 215 different workrooms, printing shops, clothing shops, bakeries, pearl button factories, cigar shops, and laundries. One hundred and fifty-six of these workrooms or 73 per cent. had a temperature of 23° C.

TABLE SHOWING AMOUNT OF PHYSICAL WORK PERFORMED BY SUBJECTS AT WILL UNDER DIFFERENT TEMPERATURES.

| Series | Riding bicycle or lifting dumb-bells |
|---|---|
| III. Summer. 4 subjects | On 10 days at 30° (86° F.) an average of 31,061 ft. lbs per day was done.<br>On 10 days at 20° (68° F.) an average of 42, 820 ft. lbs. per day was done.<br>This in per cent. is 37% more at 20° (68° F.) |
| **Series** | **Lifting dumb-bells. Bonus paid for physical work** |
| VII. Fall. 4 subjects | On 10 days at 24° (75° F.) an average of 22.075 ft. lbs. per hour was done.<br>On 10 days at 20° (68° F.) an average of 25,250 ft. lbs. per hour was done.<br>This in per cent. is 15 more at 20° (68° F.) |

Passing to the problem of heavier physical work such as lifting dumb bells or riding a stationary bicycle the effect of temperature was very much more marked. The tests were conducted on the same optional basis used in the previous experiments and the results as tabulated below indicate a striking influence of air conditions, 15 per cent. more work being done at 20° (68° F.) than at 24° (75° F.) and 37 per cent. more than at 30° (86° F).

That such conditions of overheating as were used in these experiments are

(73° F.) or over, and 63 or 29 per cent. had a temperature of 27° C. (80° F.) or over. In tabulating these analyses all cases were excluded in which the outdoor temperature was over 21°(70° F.).

It must always be remembered that indoor temperatures over 20° are much more detrimental in their effects than the same temperatures outdoors, on account of the comparative absence of air movement. The actual effect of the atmosphere upon the body depends on the rate of heat loss from its surface and this depends on the humid-

ity and movement of the air as well as on its temperature. Leonard Hill has devised an instrument called the Katathermometer for measuring the combined effect of all these factors by the rate of cooling of special wet and dry thermometer bulbs previously heated to a temperature above that of the atmosphere. Studies made by me with this instrument have shown that a temperature of 24°–26° C. (75–79° F.) outdoors with a moderate breeze were more comfortable than an indoor temperature of 22° C. (72° F.) in a room with a fire.

The results of our experiments on the effect of air temperature upon optional work cannot of course be directly applied in a quantitative sense to work under factory conditions. Our subjects were permitted to remain entirely idle if they chose. On the other hand they had a slight but distinct money incentive to accomplish as much as possible, while the factory operative, if not employed on piece work, has ample opportunity to work at somewhat less than maximum efficiency without any loss as a result. The experiments cited furnish very clear evidence that a temperature of 24° (75° F.) and still more one of 30° (86° F.) produces a marked disinclination to any form of physical work, even such light work as typewriting. It can hardly be doubted that this disinclination actually results under factory conditions in a definite decrease in output; and if such is the case the problem of securing adequate factory ventilation and taking other steps necessary to prevent overheating is one of vital importance to all who are interested in minimizing fatigue and increasing production in American industry.

# MISSING LINKS IN THE CHAIN OF EVIDENCE CONCERNING OCCUPATIONAL DISEASES.

## A MAP OF THE ROAD TO HEAVEN BY A SOUL IN PURGATORY.

W. H. Rand, M. D.

UNDER the current system of registering vital statistics, a record is kept of deaths by nativity, sex, and age. Memoranda of this sort are indispensable as a base for calculating life insurance risks and for other purposes. But the occupations which the decedents followed in life are rarely specified; and, if they were, the information from the viewpoint of industrial hygiene would be partly irrelevant and wholly useless, since mortality statistics are like necropsies—they reveal the cause of death (sometimes) but suggest no measures for the prevention of disease.

Occupational hygiene, on the other hand, does not concern itself with the compilation of mortuary tables, but seeks by every possible means to eliminate or control the industrial conditions which tend to cause disease and death of the workers. In order to attain this object there must be an exact and comprehensive preliminary study of industrial conditions in all their ramifications so far as these conditions affect the health of the worker. Some of the data requisite for a mere statement of the problem with which one must cope are not yet available.

First of all, every applicant for employment should undergo a thorough *physical examination* prior to his engagement in any industrial occupation. This measure is necessary for the reciprocal protection of employer and employee. If the medical certificate vouchsafes to the workman a clean bill of health at the time of beginning his labor, any subsequent development of disease should constitute a *prima facie* claim for compensation; whereas, in case the man were found at the outset to be suffering from an organic or constitutional disease, he would be estopped from demanding indemnity for an ailment which he already had on entering his employer's service. Thus the question would be open to all the equities. At present it is difficult to prove or disprove a direct causal relation between the workman's occupation and the illness or invalidism from which he may suffer, and for wh ch he may, or may not, be entitled to receive compensation under the law.

A second requisite is that data concerning occupational diseases should be *sanely collated and interpreted*. As an illustration of the absurd manner in which morbidity statistics are sometimes assembled and misapplied, take a certain monograph on industrial diseases. It contains information of distinct value pertaining to ailments common among workmen occupied in executing various industrial processes. But the work is vitiated and the import of its statistics is obscured by the

constant comparison of the data, not with the prevailing morbidity rate from the same diseases in the same locality, yet outside of industrial establishments (a legitimate comparison), but with the number of cases of the same disease in some *other industry elsewhere*. This is elaborate nonsense. Such arbitrary and incompatible correlations are as fatuous and futile as questions in "Hindoo arithmetic:"

"Two-thirds of a large flock of blackbirds alighted in an apple-tree, but a boy brandishing a whip frightened away twenty-five of them. Tell me, pretty Miss with golden locks, how many birds remained in the tree?"

Here is another report which gives 1.46 as the average death-rate from tuberculosis per 1,000 of the population in the principal cities of the United States for the year 1912. But though ostensibly dealing with tuberculosis as an industrial disease and assuming it to be excessively prevalent in some occupations the publication affords no clue to the census of non-fatal cases of the disease in the cities included in the survey among people other than factory and shop workers, and no evidence is adduced to show that the death-rate from tuberculosis was higher among these operatives than in the community as a whole.

Now, since *tuberculosis infection is practically universal*, it is proper to inquire whether tuberculosis in each individual case among the workers in question should be classed as an occupational disease at all; and, if so, to what extent it infests any trade or industry, either in excess of the usual rate prevailing in the community or in a more virulent form than that which generally obtains. With exact data as to the prevalence of tuberculosis in a municipal population as a whole, it would be possible to ascertain whether there is an equal, less, or greater incidence of the scourge among workers in certain trades, thus verifying or correcting the general impression and supplying definite knowledge in place of vague conjecture.

But to exploit a detached and isolated fragment of knowledge (as that tuberculosis affects a given percentage of the workers in an industry) is to give undue prominence to a condition which of itself may have no hygienic significance. The incoördinated fact cannot serve as a safe basis for the inference (much less as a demonstration) that the occupation in question is a factor predisposing to phthisis. The occurrence of the disease may be a mere coincidence or accidental circumstance; or, it may be attributable to extrinsic causes, as infected dwellings, unsanitary environment, lack of physiological resistance or other predisposition due to heredity, unfavorable economic conditions, malnutrition, etc. All other contributory causes must be allowed for before it is possible to isolate and determine the value of the residual etiologic factor, the occupation. For the effect of the occupation is only one of the unknown quantities entering into the equation.

If we should undertake, for instance, to discover what degree of malign influence, if any, the shoe industry may have as an exciting cause of tuberculosis, it would be necessary first to eliminate all other factors, incidental

or inherent in external conditions which tend to produce the same result. In a general way, the effect of shoe factory employment in causing consumption, or the absence of such effect upon the workers, could be approximately determined by ascertaining the rate of tuberculosis morbidity per thousand of the population in the selected community and then comparing the percentage of cases in the entire population with the relative proportion of such cases in the local shoe industry. Other conditions being equal, any excess rate of tuberculosis among shoe factory operatives, over and above the general ratio, might then be properly ascribed to the prejudicial influence of the trade. But this excess rate must not be assumed, but proved to exist.

Thus we might set up a *standard or measure of morbidity prevalence* which would yield more valuable information than a comparison of the relative frequency of tuberculosis among shoe factory workers, for example, and clothing trade workers, since labor conditions differ radically in the two industries; whereas, aside from shop, house, and personal hygiene, all people in the same community are subject to essentially identical environing conditions, sanitary or insanitary.

One other consideration is pertinent in this connection, since it should operate as a limitation of the employer's liability. It is a fact that *physical stamina, or the want of it, often determines the choice of a vocation.* The law of natural selection governs the decision. A man with the normal percentage of hæmoglobin in his blood is not likely to become a ladies' tailor or a milliner. It is the anæmic and the weaklings that gravitate into sedentary pursuits, not of their own volition, perhaps, but of necessity. No wonder, then, that tuberculosis finds an abnormally large percentage of victims in the trades into which people of feeble constitution naturally drift. For this, however, the trade processes are not responsible nor employers liable. But workmen's compensation acts should be amended so as to define more accurately the diseases for which indemnities are allowed.

Every industry, therefore, should be investigated and its condition compared, not with that of another *dissimilar and remote* industry, but with what may be termed the *normal local standard of morbidity*, so that a common measure may be applied to all classes and conditions of men. The rate of morbidity from each disease should be determined first for the entire local population, then for workers in the industries separately, and the results compared or contrasted. This would reveal the relative industrial hazards of various trades; and the unit of morbidity incidence in one locality would be conveniently comparable with that of other localities, showing the relative salubrity not only of the occupations, but of different communities, and provoking a wholesome emulation to attain first place in a competition for municipal hygienic improvement.

Finally, as a preliminary undertaking (indispensable for the subsequent working-out of some equitable plan of industrial health insurance), a careful and exhaustive statistical canvass of

the entire field of industry should be instituted without delay. A survey of this character will include a census of the local population, with the incidence ratio of all reportable diseases in the community, and, as a distinct exhibit, their relative ratio of incidence among employees in the mills and workshops. These data are essential. When obtainable, they should indicate the aggregate number of cases of disease among industrial workers, and show clearly whether the proportion exceeds or falls below the general rate of prevalence of the same diseases in the community at large, and to what extent for each occupational process.

In default of exact information on these and kindred topics, there is a superfluity of speculation. While no records are available to show the actual ratio of deaths from tuberculosis to the total morbidity from the disease, either in the industries or elsewhere, surmises are plentiful; and, for many readers, vagrant guesses acquire unquestionable respectability when clothed in the conventional dress of a printed report.

To cite a specific instance, Doctor Philip of Edinborough "calculates," that the cases of tuberculosis morbidity are directly proportional to the number of deaths from tuberculosis in any district. He says that the incidence of tuberculosis "may be obtained by multiplying the recorded mortality from tuberculosis by ten," adding, "I believe it might be doubled without exaggeration."*

*Supplement to Transactions, 6th International Congress on Tuberculosis. Special Volume, p. 251.

Apparently the calculations of this noted sanitarian are, in this case, estimates and nothing more. That they are mere sliding-scale conjectures is evident from the author's frank admission that his figures might be safely doubled. This is on a par with the Hibernian answer to the question, How do astronomers ascertain the distance of the stars? "Oh! They guess at half the distance and then multiply by two."

But an estimate, though masked and rendered presentable by a drapery of factitious calculations, is yet an uncouth figure.

Guess-work cannot serve as a basis for statistical tabulation or for computing the incidence of disease. Besides in this instance, there is no excuse for hypothetical assumptions, since an actual census of cases is possible wherever tuberculosis has been made a reportable disease.

In Doctor Crum's admirable paper on "Mortality from Diseases of the Lungs in American Industry," it is shown from tables of the Prudential Insurance Company for the 6-year period, 1907–1912, that "the mortality from tuberculosis of the lungs in the dusty occupations was 41.1 per cent. in excess of the mortality from tuberculosis in the nondusty occupations."*

The natural inference, (though not the intentional implication, of course) is that the percentage of *illness* from tuberculosis in the dusty trades must be correspondingly in excess of that in the nondusty occupations. But

*Penn. Med. Journ., October, 1916, p. 35.

morbidity statistics to justify this inference are not forthcoming, and it is possible that the disease may be just as *prevalent*, though *less rapidly fatal*, in occupations where dust is absent and cannot, therefore, be a causative factor.

If data are accessible which tend either to encourage or remove, confirm or dissipate, one's irrepressible doubt as to these points, the proofs should be promptly adduced, so that important questions may be determined by logical deductions that have a scientific basis. If no such data exist, they should be gathered from every available source. The prime requisite is an exhaustive canvass of tuberculosis morbidity; and a simple enumeration of the cases in the registration areas should not be difficult.

But mortality statistics which merely disclose the *death-rates* from tuberculosis are not in any sense a safe gauge of the incidence of the infection, nor, from a prophylactic point of view, do they afford a single suggestion as to the best measures for ridding an industry of the scourge. "Morbidity records," said Dr. John F. Anderson, in his presidential address before the American Public Health Association, "are to the health department its chart and compass."*

*Address at Cincinnati, October 24, 1916.

# THE MILKING MACHINE AS A FACTOR IN THE PRODUCTION OF SANITARY MILK.

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Read before the Laboratory Section of the American Public Health Association meeting at Cincinnati, October 24, 1916.

ONE of the important problems confronting the sanitarian today, is the relative importance of the milking machine as a factor in the production of sanitary milk. Machines are being introduced rapidly by farmers because of the increasing difficulty of getting labor, so that the need for accurate information as to the sanitary quality of the milk produced in this way, is great. At present there is a marked difference of opinion. Some sanitarians have claimed that machines are suited for use on certified farms and their use is permitted and encouraged in some places, while others have condemned them and have forbidden their use. Our own studies have shown that there is some justification for both points of view. Some dairies, using milking machines, constantly bring in low-count milk, but a majority of them bring in high-count milk.

Earlier studies at the New York Agricultural Experiment Station have shown that with careful handling, milk of very good sanitary quality may be produced with the machine (1). In a recent examination of the sanitary condition of the machines at the station where B. L. K. milkers have been in use for ten years, thirty-four tests were made by "milking" five liters of sterilized water through one of the machines, just before it was to be used in the regular milking. In some of the experiments (See Table II), by the use of special devices, the water was sampled after passing the teat cups and hose, after passing teat cups, hose and head, and also from the large receptacle of the machine after passing all parts. Sterile water was used in order to eliminate as far as possible such variable factors as the germ content of the milk as it exists in the udder and the contamination from the outside of the cows' teats. It is believed that this is an entirely new method of attacking the problem. The men who were in the habit of cleaning the machines were not notified that the tests were being made, but followed out, as usual, the system of cleaning which had been taught to them. Since they had been doing this for seven years without any special supervision, it is not to be expected that the machines were cleaned equally well every day. Indeed the following results bear out the surmise:

TABLE I.

NUMBER OF COLONIES DEVELOPED ON AGAR PER CC. OF STERILIZED WATER AFTER IT HAD BEEN "MILKED" THROUGH MACHINE CLEANED IN ORDINARY WAY.

| Test No. | First milking | Second milking | Third milking | Fourth milking |
|---|---|---|---|---|
| 1 | *6,700 | ..... | ..... | ..... |
| 2 | *3,100 | ..... | ..... | ..... |
| 3 | 1,320 | 3,890 | ..... | ..... |
| 4 | 1,230 | 1,430 | ..... | ..... |
| 5 | *35,800 | *22,200 | ..... | ..... |
| 6 | 2,500 | 2,010 | ..... | ..... |
| 7 | 10,800 | 10,720 | ..... | ..... |
| 8 | 4,800 | 1,900 | ..... | ..... |
| 9 | 680 | 380 | ..... | ..... |
| 10 | 3,200 | 2,400 | ..... | ..... |
| 11 | 113 | 171 | ..... | ..... |
| 12 | 460 | 320 | ..... | ..... |
| 13 | 710 | 870 | 970 | 335 |
| 14 | 2,500 | 4,200 | 2,720 | 2,250 |
| 15 | 1,110 | 950 | 1,860 | 2,260 |
| 16 | 2,420 | 520 | 1,190 | 880 |
| 17 | 337 | 676 | 438 | 505 |
| 18 | 582 | 1,800 | 928 | 747 |
| 19 | 3,300 | 3,000 | 2,100 | 2,300 |
| 20 | 2,000 | 800 | 1,100 | 3,000 |
| 21 | 800 | 585 | 600 | 500 |
| 22 | 1,390 | 4,900 | 3,400 | 1,240 |
| Ave. tests 13–22 | 1,515 | 1,830 | 1,330 | 1,400 |
| Ave. tests 3–22 | 2,118 | 2,183 | | |

*Omitted from averages.

Table No. I contains the results of twenty-two tests in which the water was sampled after being received in the receptacle of the machine. In determining the averages of the different sets of milkings, Samples 1 and 2 were left out of consideration because they were not successive milkings into the same compartments of the machine pail, and Sample No. 5 was omitted because of the great difference between the two counts for the first and second milkings. One of the most surprising results was the small amount of difference between the counts when successive milkings were carried out with the same milking machine unit. In the nineteen tests included in the average of the first milkings the bacteria count was 2,118 per cc. and of the second milking, 2,183 per cc. In the ten tests where four successive milkings were done with the same unit, the averages are 1,515, 1,830, 1,330, and 1,400 per cc. To compare these averages with the results of hand milking it would be necessary to add at least 500 to them, since Harding and Wilson (2) have shown this to be the average germ content of the udder. The individual counts on the whole would be considered satisfactory from the stand-

point of market milk since they are no greater than from ordinary hand milking, but such an initial contamination might cause trouble at times in a certified dairy.

Table II contains the data which were gathered in an attempt to locate the point at which the contamination took place.

In these tests the counts from the

TABLE II.

NUMBER OF COLONIES DEVELOPED ON AGAR PER CC. OF STERILIZED WATER AFTER IT HAD BEEN "MILKED" THROUGH TEAT-CUPS, TEAT-CUPS AND HEAD OF MACHINE, AND THROUGH ENTIRE MACHINE. ALL WASHED IN ORDINARY WAY.

| | First milking | | | Second milking | | |
|---|---|---|---|---|---|---|
| Test No. | Teat cups only | Teat cups and head | Entire machine | Teat cups only | Teat cups and head | Entire machine |
| 1 | 2 | 38 | 2,530 | 20 | 15 | 2,230 |
| 2 | 2 | 230 | 10,367 | 16 | 1,140 | 787 |
| 3 | 86 | 1,270 | 2,910 | 191 | 37 | 1,670 |
| *4 | 14 | 370 | 8,600 | 80 | 18 | 9,300 |
| 5 | 3 | 43 | 184 | 57 | 3,855 | 4,900 |
| 6 | 6 | 400 | 8,700 | 28 | 1,260 | 5,100 |
| 7 | 740 | 8,400 | 23,600 | 500 | 1,020 | 2,275 |
| 8 | 95 | 940 | 840 | 2,340 | 11,200 | 1,260 |
| 9 | 1,680 | 11,400 | 8,000 | 1,510 | 2,140 | 3,700 |
| 10 | 549 | 7,200 | 6,000 | 346 | 1,570 | 1,820 |
| 11 | 2,080 | 18,400 | 25,000 | 1,810 | 1,750 | 1,710 |
| 12 | 12 | 125 | 141 | 185 | 253 | 65 |
| 13 | 1,500 | 1,110 | 4,800 | 1,150 | 520 | 1,640 |
| Ave. | 564 | 4,144 | 8,473 | 686 | 2,065 | 3,038 |

| | Third milking | | | Fourth milking | | |
|---|---|---|---|---|---|---|
| | Teat cups only | Teat cups and head | Entire machine | Teat cups only | Teat cups and head | Entire machine |
| 1 | 5 | 5 | 730 | 13 | 5 | 710 |
| 2 | 6 | 710 | 1,570 | 14 | — | 1,187 |
| 3 | 14 | 19 | 37 | 154 | 44 | 30 |
| *4 | — | — | — | — | — | — |
| 5 | 2 | 3,080 | 10,300 | 28 | 407 | 10,900 |
| 6 | 2 | 1,640 | 13,000 | 7 | — | 1,350 |
| 7 | 146 | 450 | 4,900 | 1,710 | 600 | 430 |
| 8 | 58 | 44,400 | 4,070 | 129 | 340 | 4,100 |
| 9 | 1,730 | 4,100 | 5,200 | 4,370 | 1,220 | 1,930 |
| 10 | 105 | 540 | 1,010 | 265 | 247 | 11,300 |
| 11 | 680 | 1,150 | 760 | 750 | 530 | 610 |
| 12 | 20 | 24 | 36 | 67 | — | 49 |
| 13 | 203 | 16,000 | 1,660 | 1,520 | 380 | 1,380 |
| Ave. | 248 | 6,008 | 3,606 | 752 | †421 | 2,831 |

*Test No. 4 omitted from averages as it was incomplete.

†Only 9 tests in average.

water in the machine were somewhat larger than in those recorded in Table I, the averages being 8,473, 3,038, 3,606 and 2,831 per cc. for the first, second, third and fourth milkings done in succession with the same milking unit. Even though the counts are somewhat larger, the same general conclusions can be drawn as in the previous series. Inspection of the table shows at once that no one part of the machine was responsible at all times for the greater part of the contamination. Sometimes the teat cups and tubes were practically sterile, while at other times they contributed large numbers of bacteria to the water. The same may be said about the head of the machine, except that it usually contributed more than the rubber parts. The pail, although steamed for five minutes, often contributed large numbers to the bacteria count. This may have been due to the fact that the pail of the machine was not dried after steaming. Some of the irregularities in the counts given above suggest that the sampling devices used for the tube and head samples did not always secure representative samples.

In addition to this study of the conditions in our own barn, a visit was also made to each of five farms, in the neighborhood of Geneva, where milking machines were in use. At each of these farms one unit was selected and tested as at the Station by drawing five liters of sterilized water through the machine. When the type of machine permitted, samples were also taken of the water after it had passed through the teat cups and head, but before it was received in the pail of the machine. At the same visit, process samples were taken of the milk at various points on its way from the cow to the final container. In these tests a different machine was used than the one tested with the sterilized water. The process samples consisted of the following:

1. Strippings from the cows milked by the machine.
2. Milk from the machine.
3. The same milk after being poured from the machine into a pail.

TABLE III.

CONDITION OF MACHINES AS FOUND ON FIVE DAIRY FARMS IN THE VICINITY OF GENEVA. NUMBER OF COLONIES DEVELOPED PER CC. OF STERILIZED WATER AFTER IT HAD BEEN PASSED THROUGH THE MACHINES.

| | First milking | | Second milking | | |
|---|---|---|---|---|---|
| Farm No. | Teat cups, tubes and head | Entire machine | Teat cups, tubes and head | Entire machine | Type of machine |
| 1 | 2,170 | 1,050 | 400 | 1,190 | Hinman |
| 2 | 195,000 | 170,000 | 40,000 | 36,000 | Hinman |
| 3 | 1,200,000 | 1,188,000 | 743,000 | 629,000 | B. L. K. |
| 4 | ..... | 1,462,000 | ..... | 621,000 | Empire |
| 5 | 3,500,000 | 3,174,000 | 2,310,000 | 2,516,000 | Hinman |

4. The same milk after it had run over the aerator or through the strainer.

5. The same milk in the milk can. At one farm where the milk was bottled, samples were also taken of the milk as it came from the bottler and again in the bottle. In nearly every case the milk examined was the first milk which came into contact with the utensil tested, after it had been cleaned and prepared for use. The results of this survey are given in Tables III and IV.

The samples of the water taken after it had passed through the teat cups, tubes and head of machine, indicated that the trouble at these farms was due to failure to sterilize these parts. The farmers at each place used what they believed were solutions of chloride of lime for sterilizing the teat cups and tubes between milkings, but chemical tests showed that these solutions contained barely a trace of free chlorine. The man who produced the

TABLE IV.

PROCESS SAMPLES OF MILK TAKEN AT THE SAME FARMS. SAMPLES TAKEN AT THE SAME TIME AS THOSE RECORDED IN TABLE III BUT FROM DIFFERENT MACHINES. FIRST MILKING THROUGH UNIT IN EACH CASE.

| Farm No. | Strippings of cow | Entire machine | Milk pail | Aerator and strainer | Milk can |
|---|---|---|---|---|---|
| 1 | 1,770 | 5,800 | 4,800 | ..... | 6,100 |
| 2 | 90 | 37,000 | 34,800 | 59,000 | 51,000 |
| 3 | 2,170 | 239,000 | 243,000 | 291,000 | 273,000 |
| 4 | 4,090 | 1,095,000 | 1,267,000 | 1,046,000 | 1,012,000 |
| 5 | 1,130 | *1,003,000 | | | |
| | 780 | *900,000 | 1,016,000 | 1,180,000 | 1,350,000 |

*Two units tested.

The results given in Tables III and IV are typical of what may be expected, at the present time, from the use of the milking machine on the ordinary dairy farm. At the one extreme is milk of very good sanitary quality and at the other, a milk of very poor quality. It so happens in this case that the two extremes represented in the tables were from farms using the same make of machine. In the control work which is done in Geneva by the Station it was found that these two farms bear this same general relationship to each other the year around.

lowest-count milk used salt in the solution as well as chloride of lime.

The unsatisfactory nature of the foregoing results led us to attempt a complete sterilization of our own machines by a combination of steam, harmless antiseptics and special cleanliness. After the machine had been washed in the usual manner by the dairyman who had been doing this regularly, the machines were first taken apart, and the separate parts washed, and then sterilized as perfectly as it could be done, using steam under fifteen pounds pressure on all metal parts and a strong

chloride of lime solution for all rubber parts.

Just before milking the rubber parts were rinsed thoroughly in boiling water and then the various parts of the machine were assembled, using sterile rubber gloves in handling them.

At the two places where stable air entered the machine, aeroscopes were attached so that the air was filtered through sterile, fine sand before entering the machines. Tests showed that the sand filters were efficient as a means of sterilizing the air. Five liters of water were drawn through the machine as before. The results are given in Table No. V.

Unfortunately, it was found that the water which was "milked" through the machine had not been perfectly protected from contamination by the methods adopted for that purpose. In six tests the difference between the number of colonies obtained before milking and the number obtained after milking was so slight as to indicate that the machine was practically sterile. In the other three tests the difference was small. Further tests are in progress, designed to show whether the machine can be completely sterilized.

The question of the preservation of the teat cups and rubber connections of the milking machine in a sanitary condition, from milking to milking, is one which has always troubled the user. In England, the tendency among sanitarians seems to be to condemn all machines in which rubber parts are used (3). In America the machines which have made the most headway so far, have been those with rubber in their construction. What should be the attitude of sanitarians in this country? In view of the results recorded in this paper, it appears that the machines at present on the market

TABLE V.

MACHINES AT EXPERIMENT STATION CLEANED BY SPECIAL METHODS. NUMBER OF COLONIES ON AGAR PER CC. OF STERILIZED WATER AFTER IT HAD BEEN "MILKED" THROUGH MACHINE.

| Test No. | Water before milking | First milking | Second milking | Water before milking | Third milking | Fourth milking |
|---|---|---|---|---|---|---|
| *1 | 1 | 5 | 2 | 1 | 4 | 5 |
| 2 | 5 | 63 | 13 | 10 | 13 | 9 |
| *3 | 1 | 7 | 6 | — | 5 | 4 |
| *4 | 4 | 4 | 8 | 5 | 6 | 16 |
| 5 | 4 | 13 | 16 | 4 | 43 | 14 |
| *6 | 2 | 1 | 2 | 15 | 3 | 6 |
| *7 | 3 | 7 | — | 1 | 5 | 16 |
| 8 | 3 | 25 | 15 | 3 | 15 | 8 |
| *9 | 0 | 2 | 1 | 1 | 10 | 6 |
| | — | — | — | — | — | — |
| Averages of all tests | 2 | 14 | 8 | 5 | 12 | 9 |
| Averages of six tests* | 2 | 4 | 4 | 2½ | 5½ | 9 |

in this country when in the hands of an intelligent farmer can be successfully used to produce a milk of higher sanitary quality than that ordinarily obtained from hand milking. Studies are still in progress at the Station designed to determine the best practical method of caring for the milking machine. The final results will appear in the form of a bulletin from the Experiment Station.


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# REPORT OF COMMITTEE ON SEWERAGE AND SEWAGE DISPOSAL.

OF THE

SANITARY ENGINEERING SECTION, AMERICAN PUBLIC HEALTH ASSOCIATION.

To be presented at the Annual Meeting to be held in Washington, October 17-20, 1917.

THE Committee on Sewerage and Sewage Disposal presented a report at the Annual Meeting of the Sanitary Engineering Section of the American Public Health Association held in Cincinnati on October 26, 1916, suggesting definitions for the terms used in sewerage and sewage disposal practice.

This was intended as a progress report and a full discussion of the definitions was invited. A number of members of the Sanitary Engineering Section forwarded written discussions, and all endorsed the purpose of the committee to clearly define the terms used in sewerage and sewage disposal practice.

The committee has amended a number of the definitions contained in the report presented at the Cincinnati meeting in accordance with the weight which they thought should be given to the criticisms and suggestions received, and has prepared a revised report.

It is hoped that the definitions now presented may be generally acceptable to those engaged or interested in work of sewerage and sewage disposal, and that they will be helpful to the engineering profession.

We recommend that in reports, contracts and agreements prepared by engineers and health officers the terms defined in this report be used and be given the meanings designated herein.

## DEFINITIONS OF TERMS USED IN SEWERAGE AND SEWAGE DISPOSAL PRACTICE.

### SEWERAGE AND DRAINAGE.

1. SEWAGE

*Sewage* is a combination of the liquid wastes conducted away from residences, business buildings and institutions, together with those from industrial establishments; and with such ground, surface and storm water as may be present.

(a) *Domestic Sewage* is that from residences, business buildings or institutions.

*(b) *Industrial Wastes* are the liquid wastes resulting from the processes employed in industrial establishments.

2. DRAINAGE

(a) *Surface Water* is that portion of the precipitation which runs off over the surface of the ground.

(b) *Storm Water* is that portion of the precipitation which runs off over the surface during a storm and for such a short period following a storm as the flow exceeds the normal or ordinary run-off.

(c) *Ground Water* is that which is standing in, or passing through, the ground.

3. SEWER

*A Sewer* is a conduit for carrying off sewage.

* In the opinion of the committee, the term "Industrial Wastes" is preferable to "Trade Wastes."

(a) *A Common Sewer* is a sewer in which all abuttors have equal rights of entrance and use.

(b) *A House Connection* is a pipe leading from a building to a common sewer.

(c) *A Lateral Sewer* is a sewer which does not receive the sewage from any other common sewer.

*(d) *A Sub-main or Branch Sewer* is a sewer into which the sewage from two or more lateral sewers is discharged.

(e) *A Main or Trunk Sewer* is a sewer into which the sewage from two or more sub-main sewers is discharged.

(f) *An Outfall Sewer* is a sewer extending from the lower end of the collecting system to the point of final discharge into a body of water, or to a sewage treatment plant.

†(g) *A Separate** *Sewer* is a sewer intended to receive domestic sewage and industrial wastes without the admixture of surface or storm water.

(h) *A Combined Sewer* is a sewer intended to receive domestic sewage, industrial wastes and surface and storm water.

(i) *An Intercepting Sewer* is a sewer generally laid transversely to the general sewer system to intercept all the sewage collected by the sewers of a separate system or the dry weather flow of sewage and such additional surface and storm water as may be determined from a combined system.

(j) *A Relief Sewer* is a sewer designed to carry a portion of the flow from a district already provided with sewers of insufficient capacity, and thus prevent overtaxing the latter.

(k) *A Storm Water Overflow Sewer* is a sewer designed to carry the excess over a certain volume of combined sewage from a main or intercepting sewer to an independent outlet.

4. Drain

*A Drain* is a conduit for carrying off storm water, surface water, sub-soil or ground water.

(a) *A Storm Drain* is a conduit for carrying off surface and storm water.

(b) *A Land Drain* is a conduit for carrying off sub-soil or ground water, and for draining land.

5. Sewer System

*A Sewer System* is the collecting system of sewers and appurtenances, together with such small pumping stations as may be required to lift the sewage from low-level districts.

(a) *A Combined System* is a system of combined sewers.

(b) *A Separate System* is a system of separate sewers.

6. Sewerage Works

*Sewerage Works* comprise the sewer system, main pumping stations, treatment works, means of disposal of effluent and sludge, and all other works necessary to the complete collection, treatment and disposal of the sewage.

7. Sewer Appurtenances*

(a) *A Manhole* is a shaft, or chamber, leading from the surface of the ground to the sewer, large enough to

*The committee is of the opinion that preference should be given to the term "Sub-main Sewer" rather than to "Branch Sewer."

† In the opinion of the committee, the use of the term "Separate Sewer" is preferable to "Sanitary Sewer," which latter term should be discontinued.

* Drain-structures similar to those defined under sewer, sewer system, sewerage works and sewer appurtenances are to have like names and definitions.

enable a man to gain access to the latter.

(b) *A Lamphole* is a small vertical pipe or shaft leading from the surface of the ground to the sewer, for admitting a lantern or reflected light for purposes of inspection.

(c) *A Wellhole or Drop Manhole* is a vertical shaft in which sewage is allowed to fall from one sewer to another at a lower level.

(d) *An Inlet* is a connection between the surface of the ground and a combined sewer or drain for the admission of surface or storm water.

(e) *A Catch Basin* is a chamber inserted in an inlet to prevent the admission of grit and other coarse material into the sewer or conduit.

(f) *A Flush Tank* is a tank in which water or sewage is accumulated to be quickly discharged later, for the purpose of flushing the sewer.

(g) *A Regulator* is a device for controlling the quantity of sewage admitted to an intercepting sewer.

(h) *An Outlet* is the end of a sewer or drain from which its contents are finally discharged.

(i) *A Storm Overflow* is a weir, orifice or other device for permitting the discharge from a combined sewer of that portion of the storm flow in excess of that which the sewer is designed to carry.

## Sewage Disposal.

### 8. General Terms

(a) *Sewage Disposal* is a generic term applied to the act of disposing of sewage by any method.

*(b) *Sewage Treatment* is the process to which sewage is subjected in order to partially remove its impurities or so change them as to render the effluent fit for final discharge.

(c) *Contamination* is the introduction into a water of bacteria or other substances which tend to render it unsuitable for domestic use.

(d) *Pollution* is the introduction into a water of substances of such character and in such quantity that they tend to render the body of water or river objectionable in appearance, or to cause it to give off objectionable odors.

(e) *Influent* is sewage, or partially treated sewage, flowing into any sewage treatment device.

(f) *Effluent* is partially or completely treated sewage flowing out of any sewage treatment device.

(g) *Putrescibility* is the susceptibility of sewage, effluent, or wet sludge, to putrefaction under the conditions to which it is subjected.

(h) *Stability* is the capability of sewage or effluent to resist putrefaction under the conditions to which it is subjected.

(i) *Relative Stability* is the ratio of available oxygen to the oxygen required to prevent putrefaction, expressed in per cent.

(j) *Suspended Solids* are those which are removed from sewage or effluent by standard laboratory methods of filtration.

(k) *Settling Solids* are those suspended matters which will subside in quiescent sewage in two hours.

(l) *Clarification* is a relative term denoting the partial removal of suspended and colloidal matter by strain-

* The term "Sewage Purification" should be abandoned.

ing, sedimentation, or by coagulation and sedimentation.

(m) *Colloidal Matter* (conveniently defined) is the suspended matter which is so finely divided that it will not subside in two hours, yet will not pass through a parchment membrane in the ordinary process of dialysis.

9. Screening

*Screens.* A screen is a device containing openings of proper size to retain a part of the suspended matter of sewage.

(a) *A Coarse Screen* is one having openings in excess of one inch in least dimension.

(b) *A Fine Screen* is one having openings of one-fourth inch, or less, in least dimension.

(c) *A Medium Screen* is one having openings intermediate between a coarse screen and a fine screen.

(d) *A Bar Screen* is one composed of parallel bars or rods.

(e) *A Mesh Screen* is one composed of a fabric, usually of wire.

(f) *A Grating* consists of two sets of parallel bars in the same plane, the sets intersecting at right angles.

(g) *A Band Screen* is one consisting of an endless band or belt of wire mesh or other screening material which passes over upper and lower rollers.

(h) *A Wing Screen* is one having radial or curved vanes, usually composed of uniformly spaced bars, which rotate on a horizontal axis.

(i) *A Drum Screen* is one in the form of a cylinder or cone, consisting of perforated plates or a wire mesh which rotates on an approximately horizontal axis.

(j) *A Disc Screen* consists of a rotating circular perforated disc, with or without a concentric truncated cone of similar material.

(k) *A Cage Screen* consists of a cage, usually with sides of parallel bars or rods, so arranged that it may be lowered into the sewage and raised therefrom for cleaning.

10. Tank Treatment

*Tank Treatment* is the detention of sewage or sewage sludge in tanks, either quiescent or with continuous flow.

(a) *A Grit Chamber* is a chamber or enlarged channel in which the cross-section is so designed that the velocity is such that only heavy solids, such as grit and sand, are deposited, while the lighter organic solids are carried forward in suspension.

(b) *A Sedimentation Tank* is a tank for the partial removal of suspended matter either by quiescent settlement or by continuous flow at such a velocity and time of retention as to allow deposition of suspended matter.

(c) *A Dortmund Tank* is a vertical sedimentation tank, usually cylindrical above and with a conical or hopper-shaped bottom, into which the sewage or partially treated sewage is introduced near the center and after rising through the tank passes out at the surface—the sludge being drawn off, without emptying the tank, before it becomes septic.

(d) *A Hydrolytic Tank* is a sedimentation tank in which by biological processes a portion of the suspended matter is converted into liquid and gaseous form.

(e) *A Septic Tank* is a horizontal, continuous-flow, one-story hydrolytic tank in which the suspended matter is retained until anaërobic decomposition is to a considerable extent effected.

(f) *A Travis Tank* is a two-story hydrolytic tank consisting of an upper, or sedimentation chamber, with steeply sloping bottom, terminating in one or more slots through which the solids may slide as deposited into the lower or sludge digestion chamber, through which a predetermined portion of the sewage is allowed to pass for the purpose of seeding and maintaining bacterial life in the sludge and carrying away decomposition products, thus inducing digestion of the sludge attended by its reduction in volume.

(g) *An Imhoff Tank* is a two-story hydrolytic tank, consisting of an upper, or sedimentation chamber, with steeply sloping bottom, terminating in one or more slots through which the solids may slide as deposited into the lower or sludge digestion chamber—these slots being trapped so as to prevent the rise of gas and solids from the lower chamber—the lower chamber being provided with vents for the escape of the gases, the tank being so constructed as to facilitate the passage of the sewage quickly through the upper chamber and prevent the flow of sewage through the digestion chamber, and intended to be so operated that the sludge may be thoroughly decomposed, rendered practically free from offensive odor and so filled with gas that it can be readily drawn off and dried.

(h) *Activated Sludge Process* is the agitation of a mixture of sewage with about 15 per cent. or more of its volume of biologically active liquid sludge in the presence of ample atmospheric oxygen, for a sufficient period of time at least to coagulate a large proportion of the colloidal substances, followed by sedimentation adequate for the subsidence of the sludge flocculi; the activated sludge having been previously produced by aëration of successive portions of sewage and maintained in its active condition by adequate aëration by itself or in contact with sewage.

(i) *Chemical Precipitation* is the addition to, and thorough mixing with, the sewage of such chemicals as will, by reaction with each other or with the ingredients of the sewage, produce a flocculent precipitant; and subsequent sedimentation.

11. Sludge Disposal

*Sludge* is the suspended solids of the sewage deposited in tanks or intercepted at the surface of filters, mixed with more or less water.

(a) *Sludge Digestion* is the biological process by which organic matter in sludge is gasified, liquefied, mineralized, or converted into stable organic matter.

(b) *Separate Sludge Digestion* is the digestion of sludge in tanks entirely independent from the tanks in which it is produced.

(c) *A Sludge Drying Bed* is a natural or artificial layer of porous material upon which sludge is dried by drainage and evaporation.

(d) *Sludge Concentration* is the process of reducing the volume of sludge, and increasing its proportion of solids by allowing it to stand in a suitable

tank until the solids settle down, and drawing off the relatively clean water at the top.

(e) *Sludge Drying* is the process of drying sludge by drainage and evaporation.

(f) *Sludge Dewatering* is the process of removing a portion of the water contained in the sludge by draining, pressing, centrifuging, or by other natural or mechanical processes.

(g) *Sludge Pressing* is the process of dewatering by subjection to pressure, the solids being retained by a cloth fabric which permits the water to pass through it.

(h) *Sludge Cake* is the mass of dewatered sludge resulting from sludge pressing.

(i) *Commercially Dry Sludge* is sludge containing not more than ten per cent. of water.

12. Miscellaneous

(a) *Scum* is a mass of sewage solids, buoyed up in part by entrained gas or grease, and which, consequently, floats at the surface of the sewage.

(b) *Screenings* constitute the material removed from sewage by screens.

(c) *Grit* is the heavy mineral matter deposited from sewage.

(d) *Sleek* is the oily film of microscopic thickness present on the surface of waters about and often extending a considerable distance from sewer outlets.

13. Sewage Oxidation

*Sewage Oxidation* is the process whereby through the agency of living organisms in the presence of air, the organic matter is converted to a more stable condition or into mineral matter.

(a) *Irrigation* is the process of sewage treatment in which the sewage is applied to land for the primary purpose of purifying the sewage and the secondary purposes of supplying water and fertilizer to crops.

(b) *Surface Irrigation* is the process in which sewage is applied to and distributed over the surface of cropped ground.

(c) *Sub-surface Irrigation* is the process in which sewage is distributed beneath the surface of the ground by means of open-jointed pipes.

(d) *An Intermittent Filter* is a natural or artificial bed of sand or other fine-grained material to which sewage is intermittently applied in doses, and which by its capillarity holds the sewage for a time sufficiently long, in the presence of air, to effect by biological processes a high degree of purification.

(e) *A Contact Bed* is a water-tight basin filled with coarse material, such as broken stone, in contact with which the sewage is for a time held by control of the underdrains—the cycle of operation involving periods of filling, standing full, emptying and resting empty; so regulated as to secure such contact with the bacterial films adhering to the surface of the coarse material, and such aëration of the bacterial surfaces as may be required to oxidize the sewage.

(f) *A Slate Bed* is a water-tight tank filled with slabs of slate or other similar material, laid horizontally and spaced an inch or more apart vertically, equipped so that it may be filled with sewage, allowed to stand full for

a definite period of time, drained and allowed to stand empty for a time, for the purpose of oxidizing the organic matter deposited upon and adhering to the slates.

*(g) *A Trickling Filter* is an artificial bed of coarse material, such as crushed stone or clinkers, over which the sewage is distributed as a spray from fixed nozzles or as a film from moving distributors, through which it trickles to the underdrain system, coming in contact with the bacterial films adhering to the surface of the stones, and in which such aëration of the bacterial surfaces as may be required to oxidize the sewage is afforded.

(h) *A Dosing Apparatus* is the apparatus used for regulating the application of sewage to filters or for applying the required quantity of chemicals to sewage.

(i) *A Dosing Tank* is a tank into which raw or partially treated sewage is introduced and held until the desired quantity has been accumulated, and then discharged at such a rate as is necessary for the distribution essential to the subsequent treatment.

(j) *A Sprinkler Nozzle* is a nozzle used for applying sewage in the form of a spray to trickling filters.

(k) *A Distributor* is a movable perforated pipe, channel or water wheel which distributes sewage upon the surface of a trickling filter. There are two types of distributors—the rotary and the traveling; the rotary moves about a central axis with delivery to a circular filter; the traveling moves back and forth the length of a rectangular filter.

14. Disinfection

*Disinfection* is the destruction, by the agency of some chemical, of a large percentage of the bacteria in sewage or contaminated water, so as to materially reduce the danger of infection.

15. Sterilization

*Sterilization* is the destruction, by the agency of some chemical, of all the bacteria in sewage or contaminated water, including their spores.

Respectfully submitted,

Kenneth Allen,
Frank A. Barbour,
Harrison P. Eddy,
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Committee on Sewerage and Sewage Disposal: Mr. Kenneth Allen, Municipal Bldg., New York City; Mr. Frank A. Barbour, Boston, Mass.; Mr. Harrison P. Eddy, Boston, Mass.; Mr. Langdon Pearse, Chicago, Ill.; Mr. George S. Webster (Chairman), Philadelphia, Pa.

* The committee is of the opinion that the term "Trickling Filter" is preferable to the term "Sprinkling Filter" or "Percolating Filter," which are frequently used as synonymous terms.

# REPORT OF THE COMMITTEE ON STREET CLEANING, SANITARY SECTION, AMERICAN PUBLIC HEALTH ASSOCIATION.

Read before the Sanitary Engineering Section at the Cincinnati Meeting, October 27, 1916.

THE Committee on Street Cleaning, in its report to the Jacksonville meeting (printed in the JOURNAL for March, 1915), called attention to the desirability and importance of a more careful and complete study of the subject of the Sanitary Aspects of Street Dirt and Street Cleaning. It called attention to the widely varying opinions held upon the subject by physicians, sanitary engineers, health officers and the public, and indicated the directions in which further investigations are needed.

The committee has, since, devoted its attention principally to this branch of the subject. It was considered desirable that such data and information as is now available should be collected and placed before the Association as a basis for future work, with the hope that a knowledge of the present status of the subject and the need of further investigation would incite municipal governments, health officials, hospitals, and others to give more careful attention to the subject, and to take the necessary measures to observe and record the facts upon which intelligent conclusions alone could be based.

To this end the committee prepared and sent out to the street cleaning and health departments of every city in the United States and Canada having a population of 100,000 or over, and to a dozen or more of the leading hospitals in the larger cities, a circular letter propounding a set of questions to which replies were earnestly requested. These questions will be referred to in detail in Appendix A.

Similar communications were sent to a number of the older and larger insurance companies and valuable replies were received from the statisticians of two of them.

The committee has been disappointed at the comparatively small number of replies received. A few only of the hospitals addressed replied, invariably to the effect that they could supply no data on the subject. The majority of the replies from street cleaning and health officials were to the effect that while the writers entertained more or less positive opinions upon the subject, no records had been kept and no attempt had been made to organize and maintain a system of records relating to this particular class of vocational employment. It is not unlikely that the failure to reply of so many of those addressed was due to the absence of definite facts to report.

Although the number of replies secured was small, a number of them contained data and observations of great value, and are from men and officials of such high character and attainments as to command attention and great respect, even where, in the absence of recorded facts and statistics, observations and opinions only could be submitted.

It is not too much to say that the material thus brought together and summarized, abstracted or quoted in Appendix A constitutes the most valuable body of fact and opinion now extant upon the Sanitary Aspects of Street Cleaning and Street Dirt.

While the main subject of our investigation was the relation between street cleaning and street waste and the public health, it seemed reasonable to assume that any deleterious effects to the public

from street dirt and its handling would manifest themselves in an accentuated degree among those most constantly and intimately exposed; that is, the employees of the street cleaning departments, particularly hand sweepers, operators of sweeping machines, and those collecting and disposing of street waste. The committee, therefore, made special inquiry in regard to these classes of people.

Statistics from the street cleaning department of New York City covering a period of six years show an average death-rate among its employees of 14.8 per thousand, while the records of the health department for the same period show that the average death-rate for all males between the ages of 20 and 70 was 15 per thousand.

The records of the Tuberculosis Clinic of the New York Health Department which deals with all respiratory diseases, show that in 1911, out of 5,936 patients, only seven were street cleaners or connected with street cleaning work.

The statistician of one of the largest life insurance companies remarks that their records seem not to support the common belief that street cleaning work is especially conducive to tubercular troubles, and officials in the street cleaning and health departments of a number of cities observe that the men constantly employed in street cleaning and street waste disposal work are, as a class, as free from the diseases supposed to be incident to such work as other laborers.

Opposed to this conclusion, however, are the statistical records for three years of one of the largest life insurance companies in this country, whose mortality records in over 600 cases of death among street and sewer cleaners indicate an alarming death-rate from tuberculosis of the lungs among the younger age-classes of men in these employments. To what extent, if any, the inclusion of sewer cleaners with street cleaners may affect the result we have no means of knowing, nor do we know the length of time these men were employed in street and sewer work, or, for parts of their lives, in other and possibly more dangerous work. Presumably these men were in sound health when their policies were issued.

Notwithstanding the evidence of these particular insurance records, and the testimony and opinions of others who replied, the consensus of fact and opinion brought out in the replies is decidedly to the effect that street cleaning and the work connected therewith is not, as an occupation, more unhealthful than other laboring occupations, and the inference seems, therefore, to be warranted that since those most directly and constantly exposed to street dirt seem to be as healthy as other classes, the danger to the public at large can not be very great.

There seems to be little reliable data as to the relative unhealthfulness of those living upon or in the vicinity of dumps and filled-in ground made up of street waste. An official investigation and study in 1915 of the physical condition of 119 employees who had been engaged in work upon the dumps at Flushing Meadows, New York, for periods varying from three to six years, disclosed no evidence of infections, such as diphtheria, tuberculosis, septic sore throat, and tonsillar inflammations, although the men lived under the most insanitary conditions and worked on the dumps ten hours per day. The observations and opinions expressed in a number of the replies are almost uniformly to the effect that no deleterious results have been observed among employees engaged upon street waste dumps. In the present state of our knowledge and experience, the conclusion seems justifiable that street cleaning waste dumps are not a serious cause of disease to those living upon or near them. It should not, however, be inferred that this conclusion applies to

garbage dumps or to those where garbage is mixed with the ordinary street waste.

It was hardly to be expected that much reliable, definite data is now attainable relating to the occurrence of specific disease-germs in street waste, or to their transmission therefrom to either the employees engaged on the street or to the public at large, but there are notable expressions of opinion to the effect that no such cases have been observed, and that this is not a serious source of danger to the public.

While the consensus of fact and opinion disclosed in the replies is decidedly to the effect that the danger to the public health from street dirt and street cleaning is not a serious cause of disease, the particular source of any such danger as may actually exist was not clearly defined in the questions or referred to in the replies.

The dirt and waste from city streets appears in two distinct physical forms; the fresh, coarse, and usually more or less moist parts or masses that are most easily and quickly collected and removed; and the light, comminuted particles, that, when dry, we call dust.

In the light of our present knowledge and experience there seems to be no substantial reason for believing that the first named class of refuse is a serious menace to the public health, if it is collected and disposed of with reasonable promptness.

Either directly or by inference the replies indicate, as might be expected, that to the street *dust* mainly must be attributed such dangers to the public health as are due to street dirt and street cleaning. Aside from the question to what extent specific disease may be introduced into the human system by inhalation or bodily contact with street dust, it seems to be generally accepted by the medical profession and the public that the introduction of considerable quantities of dust of any kind into the respiratory system must be more or less harmful.

This matter has been the subject of no little investigation and much discussion. There is quite a body of literature on the subject, but the conclusions arrived at by investigators are not in entire accord. This is probably due in part, at least, to the fact that dust occurs in a great variety of composition and forms, differing quite widely in their effects when taken into the body. Thus, Dr. George E. Tucker of Riverside, Cal., concluded after a quite thorough investigation that the workers in Portland Cement Mills, where large quantities of dust are constantly encountered, were apparently benefited rather than injured by breathing the dust, and he cites European experience to the same effect.*

On the other hand it has been conclusively shown that in the Joplin, Mo., mine districts, where the miners are subjected to considerable quantities of rock (flint) dust, tuberculosis prevails to an alarming extent, the death-rate from that disease approximating 200 per thousand of the entire population. It is stated that: "Poor housing, exposure, alcoholism, the use of common drinking receptacles, and overwork all tend to spread infection and lessen the power of the miner to resist disease, but the prime factor in causing pulmonary trouble is the rock dust in the mines.†

In the report of the Ohio State Board of Health on "Industrial Health Hazards and Occupational Diseases in Ohio" (see page 17), Doctor Hayhurst classifies the relative harmfulness of several kinds of dust in the

*"Physical Examination of Employees Engaged in the Manufacture of Portland Cement." Paper before the Jacksonville meeting, A. P. H. A. Printed in the JOURNAL for June, 1915.

†"Pulmonary Disease among Miners in the Joplin District, Missouri, and Its Relation to Rock Dust in the Mines." Technical paper 105, Department of the Interior, Bureau of Mines, 1915.

following order: stone dust, mineral dust, ore dust, wood dust, soapstone and talc dust, flour and starch, and natural earth dust, but the basis for this classification is not given. City street dust, which is a combination of many kinds of dust material, probably about 75 per cent. inorganic and 25 per cent. organic, is not mentioned. Doctor Emerson cites, in his reply, statistics from the Tuberculosis Clinics of the New York Health Department showing that out of 5,936 patients, 756 cases occurred where the patients had been exposed to various kinds of dusty occupations, but only seven of these were street cleaners. This would seem to indicate that street dust is not a very dangerous form of this material, but the fact must be taken into consideration that street cleaners work almost wholly in the open air.

It seems rational, however, to conclude that the introduction of any considerable quantity of foreign, solid matter, whether organic or inorganic, or whatever its composition, into the nose, mouth, laryngitic passages, or lungs, must be more or less injurious to health, notwithstanding the fact that the human system seems to have acquired the ability to absorb or throw off such foreign substances to a remarkable degree; for dust is encountered everywhere. The danger must be materially greater when, as in the case of street dust, it swarms with almost countless numbers of bacteria of many kinds* and though the germs of specific diseases may not often have been observed† the probability of their presence and the possibility of contagion from them can hardly be doubted.

In view of all the facts disclosed, and notwithstanding the testimony and opinion that street dirt is not, on the whole, a serious menace to the public health, there is abundant reason for believing that street *dust* is a deleterious element in urban life, and that it is the principal source of danger to the public health from dirty streets and street cleaning operations.

If this be so, great attention should be given to preventing its formation, and to its prompt and effectual removal from city streets.

Summarizing the results of our investigation the following conclusions seem warranted.

1st. That street cleaning and work connected therewith, as an occupation, is but little if any more unhealthful than the average of other laboring occupations.

2d. If street cleaners, who are constantly engaged upon the streets, and therefore intensively subjected to the effects of street dirt in all its forms, are not injuriously affected thereby, no great danger to the public health from street dirt and street cleaning operations is to be apprehended.

3d. That such danger therefrom as may exist is almost wholly attributable to street dust.

4th. That dumps and land-fills composed of street waste (unmixed with garbage) are not notably detrimental to the public health.

5th. While disease germs doubtless exist in street dirt and dust, there is, at present, no positive evidence available that germs from this source are responsible for the occurrence of specific diseases, though the possibility and even probability of contagion thereby should be assumed.

It should be noted that we are, in this report, dealing with the sanitary aspects, alone, of street cleaning. There are abun-

*See paper by Melville C. Whipple on "The Results of Studies upon the Dust and Bacteria Content of the Air of Cities," read at the Jacksonville meeting, A. P. H. A. Printed in the JOURNAL, August, 1915.

†Dr. William Thro of Cornell Medical College has isolated *streptococcus veridens*, supposed to be connected with chronic infectious arthritis, from the dust of New York.

dant reasons for keeping city streets clean regardless of the public health.

In conclusion the committee again calls attention to the paucity of actual statistics and accurate scientific investigation in this field. The possible importance of the subject as a factor in the public health entitles it to more careful study. The number of employees in the street cleaning departments of our cities is sufficient to warrant their segregation into a separate class of industrial workers, and it is urgently recommended that street cleaning departments, public health departments and the hospitals shall provide and maintain an adequate system of observation and record that shall, in time, enable us to arrive at reliable, definite conclusions as to the true sanitary aspects of street dirt and street cleaning.

S. Whinery,
George H. Norton,
John T. Fetherston,
C. M. Talbert,
Richard T. Fox.

## APPENDIX A.

### Abstracts, Summaries and Quotations from the Replies Received to the Circular Letter.

In considering the replies to the questions sent out it will be most convenient to consider each question seriatim; and, to avoid the repetition in full of the names and official positions of those who favored us with replies, they will be referred to by conventional symbols, as follows:

A. John T. Fetherston, Commissioner of Street Cleaning, New York.

B. Dr. Haven Emerson, Deputy Commissioner, Dept. of Health, New York City.

C. John W. Paxton, Supt. of Street Cleaning, Washington, D. C.

D. Robert E. Doyle, Acting Supt. of Street Cleaning, Washington, D. C.

E. Walter F. Glade, Commissioner of Public Works, Providence, R. I.

F. Dr. Charles V. Chapin, Supt. of Health, Providence, R. I.

G. Gus. H. Hanna, Supt. Dept. of Street Cleaning, Cleveland, Ohio.

H. Dr. C. E. Ford, Commissioner of Health, Cleveland, Ohio.

I. Dr. E. R. Hayhurst, Director, Division of Industrial Hygiene, Ohio State Board of Health.

J. Charles O. Davis, Supt. of Street Sanitation, Milwaukee, Wis.

K. J. G. McBride, Commissioner of Health, Seattle, Washington.

L. Frederick L. Hoffman, Statistician, Prudential Insurance Co., Newark, N. J.

M. Dr. Luis I. Dublin, Statistician, Metropolitan Life Insurance Co., New York.

#### Question 1.

1. Have you any actual vital statistics or records relating to the unhealthfulness or mortality, as compared with the laboring men of the same general class and age, of men engaged in street cleaning work?

(a) Of those actually engaged on the street as hand or machine sweepers or in collecting sweepings.

(b) Of those engaged in removing street waste from the streets to place of final disposal, especially of those constantly employed upon street-waste dumps.

REPLIES.

A. Submits a table showing that in 1914, 9,224 medical examinations of employees of and applicants for positions in all positions in the Street Cleaning Department were made, resulting as follows:

| | | |
|---|---|---|
| Surgical cases, | hernia | 79 |
| | Other | 1,979 |
| Medical cases, | tuberculosis | 94 |
| | Rheumatism | 591 |
| | Other | 4,598 |
| | Feigning illness | 339 |
| | Pension examinations | 537 |
| | Examination of new applicants | 1,027 |
| | | 9,244 |

It will be observed that, excluding the surgical cases, new applicants and feigned illness 1.62 per cent. of the examinations disclosed tuberculosis.

Mr. Fetherston submits also a table giving for each of the years 1909 to 1914 inclusive, the number of regular employees in the department, the number of deaths, and the death-rate per thousand. We have added a fifth column, from data supplied by Doctor Emerson, giving the death-rate of males between the ages of 20 and 69 in the whole city of New York. It is stated that of the deaths in the department in 1914, seven were caused by accidents, thus reducing the number due to disease in that year to 53, or 88 per cent. of the whole number. If we assume a like ratio of accidental deaths for the other years the average disease death-rate per thousand is reduced to 13. The table follows:

| Year | No. of regular employees | No. of deaths | Death-rate per 1,000 | Death-rate of all males between the ages of 20 and 69 in New York City |
|---|---|---|---|---|
| 1909 | 5,765 | 79 | 13.7 | 15.20 |
| 1910 | 5,881 | 80 | 13.6 | 15.48 |
| 1911 | 5,148 | 95 | 18.4 | 15.40 |
| 1912 | 5,292 | 111 | 21.0 | 14.80 |
| 1913 | 5,464 | 62 | 11.3 | 14.60 |
| 1914 | 5,474 | 60 | 11.0 | 14.50 |
| Average | 5,504 | 81 | 14.7 | 15.00 |

B. The reply submitted by Doctor Emerson to this and the other questions is of such interest and value that it is attached in full to this report as Appendix B to which special attention is invited.

J. "We have no actual vital statistics concerning this matter. . . . "The Commissioner of Health and others in the health department are inclined to . . . believe there is nothing particularly detrimental in the work of street cleaners, and that, although these men may work in dust and dirt, they are not any more susceptible to tuberculosis or other diseases, than are those employed in other work. They account for this in some measure by the fact that these men are constantly out of doors."

"In the last four years, out of all the men employed in my department, there was only one man who died of consumption, which, I think was contracted before he took city employment."

L. "There is a brief reference to street cleaners in my bulletin 'The Mortality of Consumption in Dusty Trades.' (U. S. Bureau of Labor Statistics, 1908.)

"Since that time we have tabulated our additional experience, and a copy of the same is hereto atttached. You will note

that the incidence of tuberculosis is not excessive. The only explanation which we can make is that the risk of tubercular affection through street dust is not as serious as has generally been assumed to be the case. Since most of the street cleaners are physically below the average and are often men who are run down in health through unemployment, etc., it would seem that if street dust was as injurious to health and as dangerous to life as is often assumed, the incidence of tuberculosis would be distinctly higher among those constantly employed on the streets than is actually shown to be the case."

"We have no separate classification of street cleaners and those employed in refuse disposal. As a matter of fact, the number of this group insured with us is relatively small and we would not like to have you attach too much value to our statistics, which, however, are quite suggestive."

The table referred to by Mr. Hoffman giving the Prudential Company's industrial experience, 1897 to 1912, follows:

M. "We find a high proportionate mortality from pulmonary tuberculosis among street and sewer cleaners especially in the age period 25–34, when 55.6 per cent. of all the deaths were from this disease. In all occupations the percentage at this age period from tuberculosis was only 40.9 per cent. In the same way, in the age period 35–44 the percentage of tuberculosis to all causes is 46.9 as against 32.9 in all occupations. I would say that even in our small numbers there is very decided evidence that these workers show an undue amount of pulmonary tuberculosis in their mortality.

You may be interested also in the fact that there is a high incidence of pneumonia. Pneumonia caused 9.5 per cent. of all of the deaths among these people as against 7.2 per cent. in all occupations. It is especially in the later age periods that the conditions become serious. Thus, in the age period 55–64, 10.6 per cent. of all the deaths were from pneumonia although all occupations showed only 7.5 per cent. In the age period 65 and over, 11 per

STREET CLEANERS MORTALITY FROM TUBERCULOSIS OF LUNGS. PRUDENTIAL INSURANCE COMPANY'S INDUSTRIAL EXPERIENCE, 1897–1912.*

| Age at death—years | Deaths from | | Per cent deaths due to tuberculosis | |
|---|---|---|---|---|
| | All causes | Tuberculosis | Street cleaners | Males U. S registration area 1900–1905 |
| 15–24 | 1 | 0 | 0 | 27.8 |
| 25–34 | 26 | 8 | 30.8 | 31.3 |
| 35–44 | 65½ | 21 | 32.3 | 23.6 |
| 45–54 | 100 | 20 | 20.0 | 15.0 |
| 55–64 | 104 | 10 | 9.6 | 8.1 |
| 65 and over | 81 | 4 | 4.9 | 2.7 |
| Totals and averages | 377 | 63 | 16.7 | 14.8 |

*It will be noted that the last column covers only the last six years of the sixteen-year period.

cent. of the deaths were from pneumonia as against 6.3 per cent.

These findings are in accord with the work of others showing the high incidence of the respiratory conditions in those exposed to varying weather conditions, dirt and dust. These workers also show a fairly high incidence of accidents especially in the age period 65 and over. It appears as though they had twice as high a proportion from violence as is experienced by all occupations."

Doctor Lubin, later, supplied a table giving in detail the statistics upon which his conclusions are based. An abstract of this table is here given. (The figures in this table differ slightly, it will be noticed, from the statements above.) It is to be regretted that these statistics cover a period of three years only.

*Replies.*

D. "The few men who have been with us for a considerable period of time seem to be in good health, and we have no difficulty in regard to sickness with our dumpmen who are constantly employed at places where large amounts of sweepings, ashes, etc., are deposited."

E. "So much has been said in recent times upon the subject of disease-laden dust in city streets, and it has become a matter that we have frequently considered, and has prompted us to carefully observe the conditions of the health of the men employed in cleaning streets, and in particular, those who used the broom and who were more exposed to the dust that they stirred up. As a result of our observations there appeared to be no evidence whatever to sustain the opinion that street

METROPOLITAN LIFE INSURANCE CO.; INDUSTRIAL DEPARTMENT. MORTALITY EXPERIENCE, 1911-1913.

Number of deaths from principal causes and per cent., each cause, of all causes among street and sewer cleaners by age-periods over fifteen years;—white males

(Rearranged from original table)

| Total deaths (609) | | | Percentage of deaths from specified causes, of deaths from all causes in age-periods | | | |
|---|---|---|---|---|---|---|
| Age periods | No. of deaths each period | Per cent. of whole | Tuberculosis (107 deaths) | Pneumonia (72 deaths) | Bronchitis (6 deaths) | All other causes (424 deaths) |
| 15–24 | 2 | 0.3 | 0.0 | — | — | 0.3 |
| 25–34 | 22 | 3.6 | 59.1 | 4.5 | — | 36.2 |
| 35–44 | 72 | 11.8 | 44.4 | 15.3 | — | 40.3 |
| 45–54 | 122 | 20.0 | 27.0 | 10.7 | — | 62.2 |
| 55–64 | 196 | 32.2 | 10.2 | 11.7 | 1.0 | 77.0 |
| 65 and over | 195 | 32.0 | 4.6 | 12.3 | 2.1 | 81.0 |
| Average age at death | | 57.4 | | | | |
| Averages | | | 47.7 | 57.7 | 67.7 | 59.7 |

QUESTION 2.

In the absence of actual statistics will you kindly give the results of any facts or observations of your own covering the matter named in Question 1?

dirt is a menace to the public health. A large number of the men engaged in cleaning streets in this city have been employed a long time, some of them for twenty-five (25) years or more. They are a husky,

healthy lot. Their general health will compare favorably with any class of men, laboring or otherwise, due, not to the fact that their occupation induces longevity but probably because their work is active and outdoors."

G. "I have watched the condition as to the health of our men from year to year and find that I must differ somewhat with the opinions of the medical profession as to the danger of tubercular germs which might lurk in street sweepings to the detriment of the worker. In order to test out this theory, I have placed men at work as blockers and some as loaders that were afflicted with tuberculosis. They were constantly on the street and handling the débris. All of the men were benefited in health and eventually pronounced cured; not one did we lose. This work, however, is on paved streets that are washed at least twice per week and never get beyond normal as to cleanliness."

I. "In my five years' of experience in the large dispensaries of Chicago and the Cook County Hospital, I discovered a number of instances of street cleaners and garbage men who applied to these institutions for treatment, both surgical and medical, and in which the occupation was a direct, or contributary factor."

QUESTION 3.

In or near many cities there exist extensive deposits or dumps of street waste upon or near which residence districts have been more or less built up.

In such cases have you statistics or records that definitely show the relative healthfulness or unhealthfulness of the people living upon or in the vicinity of such deposits, as compared with other sections of similar character and sanitary conditions except for the presence of these deposits of street waste?

*Replies.*

B. See Appendix B.

H. "I believe it to be generally recognized that odors from dumps have no effect on nearby residents other than being offensive to esthetic taste."

K. "We dispose of our garbage and waste by the sanitary fill method, and a considerable part of the street sweepings are also deposited in these fills. I have noticed particularly the absence of illness among our employees working in this division.

"Some few months ago I made a survey of the district within a radius of five miles surrounding one of these fills, in regard to health of the people, including infectious diseases in that district, the result of which was that we failed to find any evidence or other reason to believe that infectious diseases are transmitted through the agency of these germs being deposited in this sanitary fill. It is common knowledge, however, in this climate where we have considerable rainfall during the winter months and an absence of freezing weather, that epidemics of la grippe and many sore throat diseases become much more prevalent when we are favored with a few weeks of warm, dry, weather. During this winter period. the streets necessarily become very dry and dusty. This would indicate that many of these diseases become active under such ideal conditions, and cause people to wish for the rainy season, as they invariably do in this city."

QUESTION 4.

In the absence of satisfactory statistics, please give the general results of your investigations, observations and experience covering the matter named in Question 3?

*Replies.*

A. "From observations in Richmond Borough during a period of nine years,

where extensive land fills are made with mixed refuse, indications are that no appreciable degree of unhealthfulness exists where buildings are erected on such dumps, provided the depth of fill did not exceed three feet, which, from practical experience, is the maximum amount of fill within which oxidation of organic matter will take place."

G. "I have not a doubt that where parties dump offal or putrid matter with street sweepings, that during the fermentation of this matter an obnoxious odor, and in damp weather, a mist arises that no doubt is injurious to health but not to the extent that it would cause an epidemic. We have a large number of such dumps here in Cleveland but I cannot recall where anyone living adjacent to them has ever been sick on account of their residence."

QUESTION 5.

In your opinion, based upon your observation and experience, is there any perceptible difference in the relative healthfulness of the people upon or near uncleaned or poorly cleaned streets as compared with those living upon or near well cleaned streets.

*Replies.*

A. "Undoubtedly cleanliness of streets is reflected in the habits of the people, but in so far as healthfulness is concerned the conditions of houses would appear to have a greater bearing upon health questions than the relative cleanliness of streets."

B. See Appendix B.

F. "Of course, the more untidy streets are inhabited by poorer people and the mortality rate among the poor is higher than among the well to do."

H. "I believe it is recognized that properly cleaned streets are a distinct contribution toward a lowered morbidity and mortality."

I. "I am of the opinion that it would be very difficult to make distinctions as to the healthfulness of the people upon, or near, unclean or poorly cleaned streets, as compared with those living upon or near, well cleaned streets, because of the protean character of other factors which would also have great influence, as for instance the difference in neighborhoods, housing conditions, standards of morals and the like."

J. "In our opinion there is a perceptible difference in the relating healthfulness of persons residing upon or near poorly cleaned streets, as compared with those residing upon or near well cleaned streets. We believe, however, that this is due not only to the condition of the street, but to the fact that the usual sanitary conditions or otherwise in such districts, are unsatisfactory."

K. From observation, "Yes."

QUESTION 6.

As the result of your personal knowledge or experience, or of actual recorded cases, is there evidence or reason to believe that specific diseases are transmitted or spread through the agency of disease germs deposited upon the streets and thence conveyed by flying street dust or otherwise into the human system?

*Replies.*

A. "A search for information on the subject for years past provides little of value, and as a matter of personal opinion I doubt that disease is spread by flying dust."

B. See Appendix B.

C. "We have no evidence in this city that diseases are spread by the existence of street dust or by an accumulation of refuse, although we assume that such would be the cause if the streets were not regularly cleaned and the refuse carelessly and inefficiently collected and disposed of."

D. "We have no evidence of disease being conveyed by flying street dust but no doubt the breathing of a large amount of street dust would lower the resistance of the body to disease due to irritation caused by the dust particles in the delicate passages of the throat and lungs."

E. "As a result of our observations there appears to be no evidence whatever to sustain the opinion that street dirt is a menace to public health."

F. "I have no knowledge that disease is spread through the agency of germs deposited on the street."

H. "Yes."

I. "I feel very strongly that disease germs deposited upon streets can be conveyed to substances which may get into the human system, or to the skin itself, through the agency of flies and other insects, I believe there is plenty of evidence of experimental sorts to substantiate this, as for instance in the various studies of typhoid fever. On the other hand, I have grave doubts of the specific dangers that may come from disease germs deposited upon street dust, but will state that the street cleaners and repairers are the most likely classes of persons to show any evil effects therefrom. This, I believe, is due to two factors: (1) the quick destruction of disease germs by dessication and light when so deposited, and (2) the limited numbers in which any of them succeed in reaching the portals of entry into the human system. There is a further source of danger, in that wet street drainings may contain virulent organisms, which may, through improper drainage, get into the water supply, and, indirectly, into milk and produce."

J. Difficult to secure evidence. "It is, of course, my belief that cleaned streets are a big factor in public health, and we are convinced that unclean streets result in a greater number of contagious and other diseases."

QUESTION 7.

Inasmuch as other city wastes, such as garbage, night soil, and other refuse, sometimes become mixed to a greater or lesser extent with the street sweepings and may, therefore, affect the general sanitary results, will you please give the committee any statistics, facts or observations collected by you relative to the unhealthfulness of those engaged in dealing with these wastes as compared with those of the same general class engaged in ordinary occupations?

*Replies.*

A. "The consensus of opinion among officers of this Department engaged in street cleaning and refuse disposal work for a number of years is to the effect that men employed in handling or disposing of wastes are no more subject to disease than others not so employed."

D. "The present contractors for the collection and disposal of city wastes have, without exception, had considerable experience in the collection and disposal of such materials and they state that their collectors and the employees at their plants are singularly free from disease. The dead animal contractor states that he has had a man employed in skinning and cutting up dead horses, which often arrive at the plant in a partially decomposed condition, for the past twenty-five years, and he has never known this man to miss a day or to have anything worse than an occasional cold. The workers at the garbage reduction plant all seem to have a good record for health. The night soil contractor states that his men are practically never sick, although from personal observation I know that they are not overly particular in cleansing themselves of the filth which may accidently get upon their persons. The contractor for the collection and disposal of miscellaneous refuse reports that his employees, who

work in an atmosphere full of dust, seem to be almost immune from disease and that he can recall no sicknesses which would likely have been caused by their occupation."

F. "About fifty or sixty men are employed by the garbage contractor in handling garbage. Their term of service is usually too short to determine whether tuberculosis develops among them. As for the acute contagious diseases there has been only one case of diphtheria and none of scarlet fever, smallpox or typhoid fever during the last dozen years, and in twenty-five years I do not remember of a case though it is possible that one or two might have escaped notice in the earlier years.

I. "I have no information upon this point. There is, I believe, a considerable tendency on the part of persons connected with these, as in all industries, to hold up the 10 per cent. or so of persons who have enjoyed unusual health in the midst of undoubted hazards and to draw conclusions therefrom entirely oblivious of the remaining 90 per cent. who have engaged at such work, but concerning the morbidity and mortality of whom they have no information."

"In conclusion I would say that a careful investigation, not of those who are now doing this class of work, but of those who have done so in the past and who are most likely to be found by dispensary, hospital, and institutional searches, as well as inquiries among the unemployed would be most productive of results."

## APPENDIX B.

DEPARTMENT OF HEALTH.
CITY OF NEW YORK.
OFFICE OF THE DEPUTY COMMISSIONER

HAVEN EMERSON, M. D.
*Deputy Commissioner*

August 7th, 1915.

COMMITTEE ON STREET CLEANING
Sanitary Engineering Section
American Public Health Association,
95 Liberty Street, New York

*Dear Sirs:*

In reply to your letter, questions, 1, 2, 3 and 7 are best answered by the following statement—the result of a study of street cleaners and the employees of the largest ash and refuse disposal company in New York City.

1. (a): An occupational classification of the patients who were treated at the Tuberculosis Clinics of the Health Department in 1911, showed that of 5,936 patients only 7 were street cleaners. This is of interest when compared to the incidence of tuberculosis in others exposed to a variety of dusts, thus:

METALLIC DUSTS.

| | |
|---|---|
| Mechanics | 4 |
| Painters | 104 |
| Brass workers | 11 |
| Machinists | 64 |
| Ironworkers | 34 |
| Plumbers | 27 |
| Printers | 60 |
| Steamfitters | 11 |
| Jewellers | 20 |
| Tinsmiths | 14 |
| Miscellaneous | 60 |
| | 409 |

(Painters are here included among sufferers from metallic dusts, because while it is recognized that they are also exposed to turpentine, benzol, and aniline poisoning, lead is the greatest hazard.)

MINERAL DUSTS.

| | |
|---|---|
| Bricklayers | 10 |
| Glaziers | 3 |
| Masons | 15 |
| Marble polishers | 2 |
| Plasterers | 12 |
| Stonecutters | 7 |
| | 49 |

| Vegetable Dust. | |
|---|---|
| Bakers | 42 |
| Cigarmakers | 54 |
| | 96 |

| Organic and Animal Dust. | |
|---|---|
| Bootblacks | 2 |
| Brushmakers | 8 |
| Carpenters | 93 |
| Feather workers | 22 |
| Furriers | 47 |
| Hairgoods workers | 13 |
| Harness, hostlers and horseshoers | 6 |
| Ragpickers | 3 |
| Weavers | 8 |
| | 202 |

From this table of comparison it would appear that the work of street cleaners falls within the group of occupations which do not predispose to respiratory diseases, as judged by the frequency with which they resorted to the Departmental clinics whose function is not only to treat the tubercular, but also to diagnose respiratory disorders. The term "street cleaners" as thus far employed, refers to those engaged on the street as hand or machine sweepers or in collecting sweepings."

1. (b): In the month of April, 1915, the Division of Industrial Hygiene conducted an investigation of the sanitary conditions of the dumps at the Flushing Meadows, and also made a study of the physical condition of 119 employees who had been engaged in work on the dumps for a period varying from three to six years in most instances. Quoting a report which was later submitted in connection with this work, "While at first sight is seems practically inevitable that men working for any length of time in an atmosphere of dirt would be ready victims of infectious diseases such as diphtheria, tuberculosis, septic sore throat and tonsillar inflammations of varied etiology," it was really astonishing that no evidence of the occurrence of any of these diseases could be obtained by our examiners. A good deal of this land was under water, and dumping was here being done to reclaim the land. These employees work 10 hours a day, live in the poorest sort of hovels, and as regards toilet facilities general cleanliness and their mode of eating in trenches of refuse with unwashed hands, exist in primitive fashion rare even among the poorest city dwellers. The wearing of protective clothing as distinguished from ordinary street attire, as also the wearing of respirators or goggles were practically unknown. That the particles of dust arising in their work are sharply irritant, if nothing more; is evidenced by the fact that the impaction of foreign particles on the corneas of workers is a constant accompaniment of this work.

It will be noted in the tabulated list of the physical defects that were discovered upon examination, that affections of the nasopharyngeal cavities were most frequently encountered. Heart abnormalities as well as defects of the eyes were relatively speaking, fairly frequent. Forty-four individuals however, or in other words, about 37 per cent. were free from physical defects.

A detailed account of the age groups into which the workers examined fall, together with a tabulated list of the physical findings is herewith attached:

| 1: Age Groups | | |
|---|---|---|
| From 20 to 30 years | 55 | employees |
| 30 to 40 " | 36 | " |
| 40 to 50 " | 20 | " |
| and over 50 | 2 | " |
| No age given | 6 | " |
| | 119 | |

| 2: Defects Found. | | |
|---|---|---|
| Pharyngitis | | 39 |
| Hypertrophied uvula | | 11 |
| Hypertrophied tonsils | | 7 |
| Defective septum | | 1 |
| Fibrinous pleurisy | | 1 |
| Stomatitis | | 2 |
| Carious teeth | | 3 |
| Heart | (1) Hypertrophied | 1 |
| | (2) Mitral regurgitation | 3 |
| | (3 Myocarditis | 1 |
| | (4) Tachycardia | 1 |
| Eye | (1) Pterygium | 4 |
| | (2) Acute conjunctivitis | 6 |
| | (3) Corneal opacity | 1 |
| | (4) Foreign body in the eye | 2 |
| | (5) Strabismus | 1 |
| Malnutrition | | 1 |
| Scoliosis (with backache) | | 1 |
| Psoriasis | | 1 |
| Free from physical defects | | 44 |

The absence of causes of bronchitis, pneumonoconiosis, asthma or empyema is, if accepted as an authentic finding, perhaps explained by the fact that these men live and work out of doors most of the time.

Careful inquiry among the men, as well as of those supervising them, elicited nothing but emphatic denials with respect to the existence of respiratory troubles among them.

A list of the names of all those employees who had been examined was sent to the physician in charge of the Health Department Tuberculosis Clinic in the district in which they lived; the records for several years were carefully gone over but not a single one of all these individuals had apparently ever presented himself at this clinic for diagnosis or treatment.

Some months before our investigations had been undertaken, the Sanitary Bureau of the Health Department had caused an investigation to be made with a view to discovering whether persons residing in the neighborhood of the dumps had suffered from diseases traceable to the ashes and heavy clouds of dust created by this work. This inquiry tended to show that the general health conditions of the residents in this locality, compared favorably with those prevailing in parts of the city where the air was not so contaminated.

4. It is not necessary to reply to this question.

5. In giving an opinion upon this, it is evident that what is offered is merely the statement that the people residing in certain streets have dirty and unhygienic habits indoors and out. The neglect of their home conditions is noticeable and where health conditions are found to be bad there is more reason to suspect poor home hygiene than neglect of the street cleaning. We have no data in which the one varient of street dirt plays such a definite role that we could attribute a poor health record to lack of street cleanliness.

6. Recent studies, by Bureau of Laboratories, of the bacteria in street dust, by collecting of scrapings and by plate exposures in strong light and in shade, in traffic and quiet, in breeze and when little air is stirring, do not show presence of pathogenic bacteria constantly or in large numbers. Even the occasional bacterial of pathogenic groups, *i. e.*, pneumococcus and streptococcus varieties, do not seem to be virulent when found under conditions tested. According to my own observation the men working on manure piles continuously, the men working in sewers and as scavangers licensed to remove privy contents and those working on boats carrying offal and dead animals, do not suffer from any diseases referable to their occupations. My firm belief after living continuously in New York City since a child is that the role of street dust is that of mechanical, irritant, and injurious agent, causing perhaps multiple damages to mucous membranes of upper respiratory tract, but that the infection is the result of close personal contact in traffic conveyances and in places of assemblage as stores, theaters, churches, etc, and in homes.

Yours very truly,
(Signed) H. Emerson,
*Deputy Commissioner.*

# PRESENT STATUS OF THE MINERAL WATER INDUSTRY.

FRANK L. RECTOR.

(Abstract.)

THE mineral water industry is a product of the last generation, and was established to meet the need of a safe water when the public supply was polluted or unsightly.

Waters whose source is not above criticism should be denied a market. A water that has to be subjected to some sort of purification before being offered for sale is not a reliable product. Filtration is not continuously efficient, and distillation produces a product that needs further treatment to make it agreeable for use. The more treatment a water undergoes the greater the danger of contamination.

The industry may be divided into five general classes, to which may be added a sixth, although this last group is related in no way to natural waters except in the public mind.

1. Waters for home and office use, selling at a moderate price.

2. Waters, usually carbonated, used in clubs, hotels, etc., selling at a high price.

3. Waters used for medicinal purposes.

4. Waters fortified so as to give them medicinal value.

5. Waters erroneously claiming medicinal value due to the presence of some medicinal agent in small amounts.

6. Waters purified by filtration, distillation, or other methods which changes the chemical or biological content so as to remove them from the class of mineral waters.

Reputable firms engaged in this industry exercise every precaution in handling the product from source to consumer. Only in recent years has the importance of scientific control been appreciated. A visibly clean bottle was thought formerly to be sufficient for the purpose. Today some form of sterilization is necessary to keep pace with sanitary requirements.

Among the questions referred to a scientific staff for decision are: methods of washing and sterilizing bottles and stoppers, examination of solutions used for washing purposes, arrangement of machinery and apparatus in the warehouse, investigation of complaints regarding quality of the water, and many other related problems.

Some dealers bottle their product at or near the source, shipping the bottled product to distributing points; while others ship in bulk, using containers larger than a bottle for this purpose, and bottle at the points of distribution.

In 1915, eight hundred and twelve sources of natural water reported sales of over fifty-two million gallons, having a value of over five million dollars. This water came from every state in the Union except Arizona, Idaho, and District of Columbia.

This industry has a legitimate field for development in coöperation with those forces tending toward sanitary betterment of the community. Its influence is constructive and the worthy elements of the industry merit the coöperation of those interested in seeing the application of sanitary efforts to lines of commercial activity bear fruit.

Laboratory, Great Bear Spring Company,
36 Forty-first St.,
Brooklyn, N. Y.

# Book Reviews.

**The Modern Milk Problem.** *J. Scott MacNutt. New York: The Macmillan Company. Pp. 258. Illustrated. Price, $2.00.*

In the preface the author points out that there are practical and economic as well as sanitary factors in the milk problem of today and that the object of the book is to provide a convenient survey of the perplexing subject.

There has been a tendency on the part of those who are trying to solve the milk problem to concentrate their efforts on one phase of the situation. Some devote their efforts toward the sanitary factors while others lay stress on the economic phase. This book should go a long ways towards straightening out this situation for it gives clearly the relation of the various factors in the milk problem.

The author first explains why there is a milk problem, then points out the situation as it exists today. Following this is an interesting discussion of the sanitary and economic factors involved in the problem. Perhaps the most interesting part of the book is Chapter V, the last chapter which bears the title: "How Solve the Problem." Here the author sums up the salient factors in the solution of the problem in a concise manner in which he shows a clear understanding of the situation.

The section entitled "Who is to Solve the Milk Problem," is commendable but too brief.

Numerous statistics and interesting facts regarding milk are given in the appendices.

The book does not bring out any new facts regarding the milk problem but presents in an excellent manner a survey of the market milk situation. It should be of value to any one interested in the milk problem.

*S. Henry Ayres.*

**Tuberculosis—Its Prevention and Proper Treatment.** *Thomas W. Gibson, Albuquerque, N. M. 47 pp. Paper, 35c.*

Mr. Gibson sets forth from the story of his own personal fight with the disease, the means of prevention and the method of cure as his experience has proved their value. The little book is well worth reading by every one, whether sick or well. It is particularly valuable because of the author's cheery note of hope to the sufferer and his assurance that what he has accomplished others may accomplish by following the same painstaking methods.

There are 47 pages in the book. It contains valuable information about various climates and altitudes as well as interesting chapters on Heredity, Prevention, Symptoms, Exercise, Cures and kindred subjects.

One who has tuberculosis or who has a family history of it will do well to read this little book. It may, and likely will, save such a person a great deal of time and money. Single copies of this book sell for 35 cents, and may be had by ordering direct from the author.

**The Elements of the Science of Nutrition.** *Graham Lusk. Third Edition. Philadelphia: The W. B. Saunders Company, 1917. Pp. 640. Price, $4.50.*

The second edition of this book appeared eight years ago. It represented a remarkable achievement on the part of its author, a most inclusive survey of a wide field and a concise and judicial presentation of results. The progress of studies in dietetics and metabolism has steadily added to the difficulty of such a critical compilation but Doctor Lusk has proved himself equal to the exacting task. The new book is about twice as large as the old, an expansion which could not be avoided if the original standard was to be maintained.

The present interest in problems of nutrition, springing from war-time conditions, has stimulated the production of small books dealing with practical phases of the matter. Some of these are of great value. The new Lusk does not omit a discussion of the economic and hygienic aspects of diet. No writer can treat of these with more wisdom and authority. But the distinction of his work lies in his appraisal of the data of pure science. The book is not primarily for the layman but for the advanced student. There is an extensive treatment of the

peculiarities of metabolism in disease and there are few practitioners who would not gain insight by mastering these chapters. Doctor Lusk has an individual style, crisp and clear, which makes his pages pleasant reading in spite of their statistical character and extreme condensation of material. The book stands alone; the facts included cannot be found in any other single work. This volume is indispensable to the specialist in the field it so ably covers.

*Percy G. Stiles.*

**Immune Sera.** *Bolduan & Koopman. New York: John Wiley & Sons. Fifth Edition. 1917. 200 pp. Cloth, $1.50.*

There is hardly a more difficult subject in the whole domain of medicine than that dealing with the problems of infection and immunity.

The tendency of most authors of works along this line has been to produce rather cumbersome volumes dealing in minute detail with these phenomena, volumes of great use to the technician, but lacking in attraction to the busy practitioner or to the student who, wishing a knowledge of these matters, has neither time nor inclination to acquire minute details.

Doctor Bolduan's book possesses the marked advantage of a concise and easily comprehended statement of the various problems with which it deals. The mere fact that it has reached its fifth edition proves that a popular demand exists for a simple practical work on this subject.

As a help to the student who desires a fair understanding of the main features of this growing science; as a readable treatise for the busy physician not too large to be slipped into pocket or bag for reference in leisure moments, this little volume is not surpassed.

It also contains a very complete description of the details of the Wassermann test as carried on in the laboratories of the New York Health Department. There is no change in scope from the previous edition but the material has been thoroughly revised.

*Francis H. Slack.*

# Health Department Report.

## Spokane, Washington.

Occasionally there comes into the hands of the reviewer for this section of the JOURNAL a municipal health department report which works itself out of that too well worn rut of too many technicalities and too little real interest, a seemingly almost impossible task; an unorthodox report, if judged by past and present experience, which combines the proper data with the elements of interest and attention to report-morphology. Strangely enough these reports are usually Western in origin, which may be the explanation, for to these Western cities are accredited many excellent morbidity and mortality rates and an interested and curious populace.

The Twenty-fifth Annual Report of the Department of Health and Sanitation of the City of Spokane (1916) is of a particularly pleasurable nature, well illustrated, well printed, and a record of excellent work and progress under Dr. John B. Anderson, Health Officer. There occurred during the year 1,051 deaths, resulting in a death-rate of 6.9 per 1,000 if based upon the government population estimate of 150,323; or if based upon the Chamber of Commerce estimate of 130,000, a rate of 8.08 per 1,000. The principle causes of death were organic diseases of the heart, 115, cancer, 112, tuberculosis, 70, pneumonia, 78, and Bright's disease, 76. Contagious and infectious diseases continued at a low point with the following exceptions: there were 3,792 cases of measles reported with 13 deaths; 202 cases of smallpox were reported, though evidently of a mild nature, no deaths resulting. In this connection the smallpox morbidity rate for Washington still continues high on account of the prejudice against vaccination, which is evidently not compulsory. Only 27 cases of typhoid fever were reported with three deaths; 19 of these cases upon investigation are said to have originated out of town. Fifty-nine new cases of pulmonary tuberculosis were reported and 59 deaths were recorded. It is interesting to note that this city, realizing the fear and dread accompanying hospitalization to so many people, has changed

the name of the "Isolation Hospital" to the more attractive name of "Rivercrest." The hospital during 1916 attended to 191 patients, the majority of whom were there for smallpox.

As the death-rate is continually decreasing, so is the birth-rate, with at least 98 per cent. birth registration, unfortunately decreasing. In 1912 the birth-rate was 17.45, and in 1916 it had declined to 12.90, 1,940 births having been reported. There occurred 112 deaths of children under one year giving an infant death-rate under one year of age per 1,000 living births of approximately 57.8, an excellent achievement. It is indeed strange, however, that the subject of infant mortality is not considered of sufficient significance to justify a more detailed discussion.

Food inspection, and particularly supervision of the milk supply, has risen after continued effort to a high standard. Such a standard has been obtained through coöperation of the dealer and the producer, plus publicity. The quality of the milk is scored, in accordance with bacteriological and chemical analyses, the score card used being modeled after the government score card, and all scores are published in the newspapers. In dairy inspection attention has been concentrated on methods rather than equipment. Trouble seems to have arisen over the illegal use of the title "Certified Milk," and it is hoped that all such illegal usage shall be penalized. It is felt that the safest milk product can only be attained by the pasteurization of the city milk supply, though precaution will be taken to see that all supplies will maintain the necessary high standard even though it is to be pasteurized, and the date and name of the day of pasteurization shall appear on the label or cap.

Considerable of the discussion of the report is devoted to food inspection, and while this is undoubtedly of vast importance, it would seem possibly more advisable to discuss such subjects as tuberculosis, infant welfare, and disease incidence with greater thoroughness than is done.

Of the recommendations, the two which seem of the greatest importance are the control of the municipal swimming pools by the Health Department and the construction and maintenance of a modern disinfecting and sterilizing plant. It is felt that "to depend upon formaldehyde fumigation in the gaseous form, not under pressure, is pinning our security of freedom from preventable diseases to a very slender line."

# Public Health Notes.

**Endemic Goiter and Drinking Water.**—F. Messerli, of the Hygienic Institute at Lausanne (Switzerland), gave to one set of rats purest Lausanne well-water, while another set received only water from the goiter-region of Payerne, with the following result (*Zentrlbl. f. Bakt.*): All the rats receiving the Payerne water became definitely goitrous and showed increased mortality; also, enlarged spleen, diarrhea, and paralysis of the hind legs were frequent (signs of chronic infection). The Payerne drinking-water is a badly contaminated surface-water and has been shown to contain also colon bacilli, paratyphoid bacilli, and the proteus.—*The American Journal of Clinical Medicine*, August, 1917.

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**Anopheles Identified.**—It is the popular idea that the mosquito that sings and causes pain when it stings, transmits malaria. This is a mistake, for the malaria-bearing mosquito is very small, makes no noise and does not cause much pain when it stings and only comes out at night.—*Louisville Health and Hygiene.*

*

**Better Occupational Statistics.**—In order that mortality statistics may be more satisfactory as they refer to occupations, Sam L. Rogers, Director of the Census, has sent out circular letters to all the physicians of the country asking that they coöperate to the extent of carefully recording or supervising the statements of occupations upon the death certificates during the year.

The Bureau of the Census is planning in the near future a monograph on tuberculosis. The value of this will be greatly increased if it is possible to show accurately the occupation of decedents.

Director Rogers puts it thus in his appeal to physicians: "As a physician you appreciate the importance of such statistics. As a physician you are by education better qualified than the ordinary informant to understand a proper statement of occupation. Will you not, there-

fore, take pains to see that the occupation items upon each one of your death certificates are properly supplied?"

**Untrained Health Officers.**—Here is a place where the trained officer shows his value. An untrained man cannot initiate, cannot lead. He will follow and copy. He is likely to be forced by well-meaning people outside the department to give undue prominence to things not at all of first importance—to "swat-the-fly" campaigns, fights on food adulteration and white-washing dairy barns, instead of attending to such unexciting features as birth registration, sewage disposal and a pure water supply.—Alice Hamilton, *Survey*, January 20, 1917.—*Indiana State Health Bulletin.*

**Safeguarding Foods and Drugs.**—In the enforcement of the Food and Drugs Act during the last year, U. S. Department of Agriculture officials analyzed 29,833 samples of foods and drugs offered for interstate shipment and for import. A physical examination was made of samples from 76,468 shipments offered for import. Of these foreign shipments, 6,353 were found to violate the law in some respects and were either excluded from the country or admitted only after the importers had relabeled them to comply with the law. Of the samples of domestic products analyzed 3,535, either because of the nature of the product or because the label on it did not tell the truth, were found to be in violation of the federal law. In 1,364 cases the Department recommended to the Department of Justice that criminal prosecution be instituted against the manufacturers or that the goods be seized. In many cases where there was no evidence of intention to defraud, and where there was merely some easily remedied flaw in the wording of a label, the shippers, after being warned in hearings, voluntarily took steps which made their products fully comply with the requirements. In all, there were held 8,715 such hearings, many of which resulted in the prosecutions indicated and the gathering of evidence for a large number of additional cases, which will be forwarded to the Department of Justice. —From *Boston Medical and Surgical Journal* for July 26, 1917.

**More Visiting Nurses for New York State.**—The *S. C. A. A. News* of New York for July, 1917, contains the following article relative to visiting nurses for county hospitals:

"The new law requiring the establishment of tuberculosis hospitals in every county in the state of 35,000 population, also makes it obligatory upon the Board of Managers of every county hospital to employ a county nurse for the discovery of tuberculosis cases and for the visitation of such cases and of patients discharged from the hospital.

"The old law gave authority to the Board of Managers to employ a county nurse. Under the provision of the new law the employment of the nurse is made mandatory.

"The value of the work of the county nurse is materially increased by the further provision of the amendment that the Board of Managers of the county hospital shall cause to be examined by the superintendent or one of his medical staff every suspected case of tuberculosis reported to him by the county nurse. All cases reported by physicians, teachers, employers, heads of families, or others, must be examined in the same manner."

## PUBLIC HEALTH AND THE WAR.

**A Sensible Suggestion From the Austrian Army.**—Hecht, an Austrian army surgeon, writing in a recent issue of *Wiener Klinische Wochenschrift*, estimates the number of syphilitics in the Austrian army now must certainly be several hundreds of thousands and complains that they are being treated in hospitals while sound and healthy men are being shot down in their stead. This actually places a premium on sexual infection and spares the syphilitics while the sound are killed. He suggests that a diagnosis of syphilis should be the signal for sending the man to the front. Surgeon Hecht is already denying the soldier afflicted with venereal disease home leave. This restriction had previously been enforced for typhoid carriers. Hecht adds that no one seems to class the venereal diseases with infectious diseases, and is convinced that this neglect to apply measures that have been found reliable with other infectious diseases will avenge itself sooner or later.

Hecht says that since the war began, a total equivalent to sixty divisions have been temporarily withdrawn from the fighting because of venereal diseases, and finally suggests, as a warning to candidates for matrimony, that the

daily papers should carry a display advertisement something like this: "Beware of Sexual Diseases. Every couple should mutually demand a certificate of good health before the wedding."

If this frightful condition prevails in the Austrian army it is fair to assume that a similar state exists in the armies of each country. It also indicates what the human race of the future will suffer when all those infected with social diseases return to civil life, bringing with them a condition worse than death on the battlefield.

This picture is black, but it need not materialize. If state and municipal authorities will give the government full coöperation in its most commendable efforts to protect the young men who are to constitute the great fighting force of the country, there will not be a great increase of venereal diseases such as has occurred among the other warring nations. It is the duty of every state and city to assist and protect the army. No greater stimulus can be given to recruiting than to give assurance of clean, healthful and wholesome environment surrounding camp life.—From *Ohio Public Health Journal* for July, 1917.

✽

**T. B. Conferences Will Focus on War Problems.**—The National Association for the Study and Prevention of Tuberculosis announces that the main theme of all the six sectional conferences will be the problem of the tuberculous soldier or rejected tuberculous recruit. The conferences will be held as follows:

New England Conference, Rutland, Vt., October 4–5.

North Atlantic Conference, Baltimore, Md., October 17–18.

Southern Conference, Chattanooga, Tenn., November 9–10.

Mississippi Valley Conference, St. Paul, Minn., October 8–9–10.

Northwestern Conference, Portland, Ore., October 15–16.

Southwestern Conference, Grand Canyon, Ariz., October 22–23.

✽

**Report of Mental Hygiene War Committee.**—One of the most far-reaching of the original medical measures that are now being carried out to insure a minimum of unfit men being accepted for the armies of the United States are those devised for the purpose of checking up on the nervous and mental conditions of recruits. The committee states that this is the first attempt ever made in organizing an army to take into consideration the "neuro-psychiatric qualfications of the men." The report has been accepted and officially incorporated into the instructions of the Surgeon General to medical officers charged with examinations of recruits in general and especially to consulting neurologists and alienists assigned to military camps. The following are the instructions of exclusion on neuro-psychiatric grounds:

RECRUITS TO BE EXCLUDED.

*I. Nervous Disease.*

(a) *On the Basis of Disease*

1. Tabes. (Look for Argyll-Robertson pupils, absent knee and ankle jerks, ataxia of station and gait.)

2. Multiple sclerosis. (Look for absent abdominal reflexes, nystagmus, intention tremor.)

3. Progressive muscular atrophy and syringomyelia. (Look for fibrillary tremors; atrophy in the small muscles of the hand and of the muscles of the shoulder girdle; scars on forearm and fingers caused by burning; deformities of feet.)

4. Epilepsy. (Look for deep scars on tongue, face and head; voice. Where diagnosis depends only upon history of epileptic attacks given by the patient, the latter should be asked to give the address of the physician who has treated him. This history must then be verified by a letter from the physician.)

5. Hyperthyroidism. (Look for persistent tachycardia, exophthalmos, tremor, enlarged thyroid.)

(b) *On the Basis of Symptoms or Combination of Symptoms or History*

1. Unequal pupils+irregular pupils+Argyll-Robertson pupils.

2. Nystagmus (in one not in albino)+absent abdominal reflexes+intention tremor.

3. Absent knee jerks associated with some one other organic neurologic symptom.

4. Exaggerated tendon jerks+Babinski.

5. Disorders of station or gait.

6. Disorders of speech (on test phrases) +facial tremor+one other organic neurologic symptom. (Stammering and stuttering *per se* is not significant of an organic neurologic con-

dition. Stammerers and stutterers are rejected by regulations. See form No. 94777.)

7. History of epilepsy. (Ask the recruit to give the address of the physician who has attended him; this information to be verified by letter.)

*II. Mental Diseases.*

(a) *On the Basis of Disease*

1. General paralysis. (Look for Argyll-Robertson pupils, speech defect consisting of distortion of words, writing defect consisting of distortion of words, facial tremor in showing the teeth, euphoria and marked discrepancies in giving facts of life.)

2. Dementia præcox. (Look for indifference, ideas of reference, feelings of the mind being tampered with (*e. g.*, ideas of hypnotism), auditory hallucinations, bodily hallucinations such as electrical sensations or sexual sensations, meaningless smiles; in general, inappropriate emotional reactions, lack of connectedness in conversation.)

3. Manic depressive insanity. (Look for mild depressions with or without feeling of inadequacy or mild manic states with exhilaration, talkativeness and over-activity.)

(b) *On the Basis of Symptoms or Combination of Symptoms or History*

1. History of previous mental illness. (Ask the recruit to state when and where he had such illness, in what hospital he was observed or treated or by what physician he was attended; this information to be verified by letter.)

*III. Psychoneuroses and Psychopathic Characters.*

Look for phobias, morbid doubts and fears, anxiety attacks, fatigue-ability, hypochondriasis, compulsions, homosexuality, grotesque lying, vagabondage.

*IV. Chronic Alcoholism.*

Look for suffused eyes, prominent superficial blood vessels of the nose and cheek, flabby, bloated, reddened face, purplish discoloration of the mucous membrance of the pharynx and of the soft palate; also ashen complexion and clammy skin; muscular tremor in the protruded tongue and extended fingers; (noticeable also in lack of control when the applicant attempts to sign his name); emotionalism, prevarication, suspicion; auditory or visual hallucinations, paranoid ideas.

*V. Mental Deficiency.*

Look for defect in general information with reference to native environment, ability to learn, to reason, to calculate, to plan, to construct, to compare, weights, sizes, etc.; defect in judgment, foresight, language, output of effort, suggestibility, stigmata of degeneration, muscular incoördination. (Consult psychometric findings.)

*VI. Drug Addiction.*

Look for pallor, dryness of skin; flippancy, mild exhilaration (if under the influence); cowardly, cringing attitude, restlessness, anxiety (if without the drug); distortion of the alæ nasi; contracted pupils (morphine) or diluted pupils (cocaine); dirty deposit at junction of gums and teeth; bluish and whitish needle scars on thighs and arms.

✽

**National Board of Medical Examiners Certificate accepted by Army and Navy Medical Corps.**—The National Board of Medical Examiners held its second examination in Washington, D. C., June 13 to 21. There were twenty-four qualified candidates, twelve of whom appeared for examination, the others having been ordered into active duty between the time of their application and the date of the examination. Of the twelve who took the examination nine passed.

The next examination will be held in Chicago October 10 to 18. The regular Corps of the Army and Navy may be entered by successful candidates, without further professional examination, providing they meet the adaptability and physical requirements.

There will also be an examination in New York City in the early part of December.

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**Medical Service in the War.**—At the request of some leading medical men in this country, Dr. T. H. Goodwin of England describes the organization of the medical service of the British army on the western front. With each battalion of infantry, regiment of cavalry, or brigade of artillery is a medical officer with a small detachment of medical and sanitary personnel, and suitable medical and surgical equip-

ment. Before an action this officer forms a "regimental aid post" in a dugout or sheltered position to which the wounded of his regiment are brought by the regimental stretcher bearers where their dressings are applied, fractures immobilized, etc., and after a short stay are removed by the field ambulance *bearer* division to advanced or main dressing stations which are formed by the field ambulance *tent* division. The means of transport with the field ambulance bearer division consists of twenty-seven stretcher squads, each of four bearers with a stretcher, seven motor ambulance wagons, and three horse ambulance wagons. From the dressing station the wounded are convoyed by the motor ambulance convoy, consisting of fifty ambulance cars with four medical officers, to the casualty clearing stations, where a large amount of surgery is done. Patients with wounds in the abdomen or head are brought back from the front as quickly as possible for early operation. The casualty clearing station is always near a railway station and the wounded are conveyed thence by ambulance trains to the stationary and general hospitals at the base or on the lines of communication. While definite rules cannot be laid down as to distances the following can be accepted as an average: From the front line trenches to the regimental aid post, 500 yards or more; regimental aid post, to advanced dressing station, half a mile to 1 mile; advanced to main dressing station, 1½ miles; main dressing station to casualty clearing station, 5 miles. The amount of medical supplies required in modern warfare is very large and in addition to these there are almost innumerable articles outside of the authorized equipment which are of immense value for the comfort and diversion of the patient. He speaks of the value of the Red Cross Service in giving aid to the regular army medical corps and speaks of the cordial coöperation of the tactful army surgeon with the fighting officers. The subject of sanitation is always a live one and the opportunities for professional work and experience are very great. In conclusion he speaks of the shortage of medical men and the consequent increasing demand. In several districts in England there is only one physician left to every 5,000 inhabitants. On the western front alone since the beginning of the war there have been 195 medical officers killed in action, 707 wounded and 62 deaths from disease. He also speaks appreciatively of the aid furnished by the United States. Six base units from the United States are now hard at work in France and a total of 253 medical men and 434 nurses have already gone over.—*Jour. A. M. A., July 21.*

**Facts for Fighters.**—The following "Supply," bulletin has been issued and circulated among Massachusetts guardsmen and drafted men by the Massachusetts Anti-Tuberculosis League:

Consumption can be contracted by those who are weak, run down, or in any way in poor condition.

In private life any person may take chances with his health, if he cares to do such a foolish thing, without necessarily hurting others or the community at large. In time of war this is different. The soldier owes it to his country to maintain his bodily efficiency at the very highest possible point. This is the best way to avoid consumption.

When a soldier is on duty, the details of his life are regulated in every way. When he is off duty he can do himself physical harm or good. Therefore he should spend this time as profitably as possible by increasing his bodily strength and energy and not wasting it. This is an important way of preventing consumption.

Excesses of all kinds weaken a man and render him liable to infection, especially to infection with consumption.

Remember that the germs of consumption and other contagious diseases are spread by spit. Therefore never spit in closely crowded quarters, barracks, tents, etc.

Danger signals. If you develop a cough, with or without spit, which hangs on for some time; if you raise any blood; if you are losing weight and strength, don't wait but go at once to the proper person and place these facts before him.

If you know that you have consumption, even though you have passed the physical examination, don't conceal it. The chances are that you will break down later on. You will do your country no good, but on the contrary you will do it great harm if you conceal this fact.

Remember that one of the greatest things you, as a soldier, can offer to your country is good health.—*Massachusetts Anti-Tuberculosis League.*

An illustrated pamphlet designed for similar

circulation has been issued as "Keep Well Leaflet No. 10" by the Educational Bureau of the New York City Health Department, emphasizing the dangers of venereal infection.

**Health Officers' Loan Library.**—Among other services to local health officers the North Dakota State Board of Health lists a Health Officers' Loan Library and a stereopticon Loan Library.

# Public Health Clippings.

### An Old Fable—

Once upon a time there was a city with a street running along a cliff. In dark and stormy weather so many people were injured by falling over the edge that the citizens gathered together to see what they could do about it. They decided to use their resources to build a hospital at the foot of the cliff so that the injured might receive immediate attention.

Now, it chanced that a great physician visited their land, and the inhabitants showed him the hospital with great pride. But he, looking up at the cliff, said: "Wouldn't it have been cheaper in lives and money to build a wall of protection along the cliff?"

### —Brought up to Date.

Once upon a time a great country went to war and needed her strong men to fight her battles. But when her sons were called together only half of them were found fit to do battle, the others being deficient in health and lacking in physical strength. "What shall we do?" said the people. "Unless our men are strong in body they will lose in battle. Let us ask Congress to appropriate a great sum and build hospitals where they may receive treatment and be cured of their diseases." And this Congress approved.

But some said: "A pity it is that great sums of money should be spent for this purpose now, whereas small sums spent a few years ago when these were boys would have made this unnecessary and saved the country's manhood from this blight of ill health and inefficiency."

And the people said, "Yea, truly! A poorer nation, but a wiser one, will we be when the war is over."—*North Carolina Health Bulletin.*

### Three Maidens.

A maiden person stern and tense
Gave modest people great offense
Because she'd rant and tear her soul
An advocate of birth control.

A maiden lady growing stout
Of dietetics long would shout
She gladly met starvation's toll.
An advocate of girth control.

A maiden woman glum and dour
With face that's long and thin and sour
Frowns on our joys in part and whole
And advocate of mirth control.

—*Illinois Health News.*

### We Should Economize.

But It Is Not Economy

To buy a cheap grade of milk for the baby;
To substitute condensed milk for cows' milk;
To neglect to keep milk on ice;
To allow windows and doors to go unscreened;
To keep windows closed to save coal;
To delay calling a doctor when unexplained illness occurs;
To curtail the health officer because of extraordinary expenses.—*Wisconsin State Board of Health Bulletin.*

### The Efficient Life.

Don't get the idea that good health is merely absence of disease or sickness. It is far more. One may not feel sick at all and still be only 60, 70, or 75 per cent. efficient. Good health is 100 per cent. of physical efficiency. It is that physical state of being where life is a joy, and plenty of hard work is a pleasure.

### The Quack.

The quack doctor is among the most despicable of swindlers. He extorts the last dollar from the sick. He holds out false hopes. He inspires needless fears. He finds dangerous maladies where none exist. He deals in falsehood, relies on ignorance, capitalizes misfortune, teaches despair for his own profit and resorts to blackmail as a useful collection agency. He prostitutes the noble art of healing to lure in trusting victims.—*Cleveland News.*

—*Boston Health Bulletin.*

### Or Nerve?

Lest we forget the Druggist's prayer, "Oh, Lord! give us courage this day to ask higher prices."—*The Pacific Pharmacist*, August, 1917.

### Behind or Befront.

The front yard is a pretty good index to the people who live in the house, but the back yard is a better index to their lives, their health and their habits of cleanliness.—*Louisiana State Board of Health.*

### A Stitch in Time.

Removing the cause before it becomes a result is the best kind of public health work!—*Los Angeles Monthly Bulletin.*

### One's Sufficient—And Sufficient's Plenty.

Dr. Plummer of Key West delicately told his colored patient that he had tuberculosis, but not to be alarmed—it was a curable disease. "Na, na, Doctor," said the old darkey, despondently, "My wife died of 'buckalosis' and she didn't have bot one. Na, na, Doctor."

### The Strides of Science.

From a child's essay on tuberculosis—"Tuberculosis used to kill everybody, but now anybody can cure it—even the doctors sometimes do."

### First-Hand Knowledge.

Headline in a local paper: "Splendid Lecture on Hookworms—The Doctor Full of His Subject."—*Florida Health Bulletin.*

Crime is largely sickness and disease.

Sickness lies at the bottom of delinquency.

"More virtue" is the cry, and virtue is health.

Hygiene can prevent more crime than any law.—*Munsterberg.*

National health will be followed by national efficiency.—*Fisher.*

Would you lower taxes? Then you must lessen disease.—*Reed.*

Neglect the public health, and taxes will surely increase.—*Reed.*

Healthy, strong men seek education and make opportunity.—*Jordan.*

Neglect the nation's health if you wish to make it decadent.—*Billings.*

Conservation of resources will naturally follow conservation of health.—*Fisher.*

It is within the power of man to drive sickness and disease from the world.—*Pasteur.*

The government which does not protect the health of its citizens is neither intelligent nor moral.—*Spencer.*

The State must prevent sickness and disease, if crime, poverty, delinquency and insanity, with their awful cost, are to be reduced.—*Monthly Bulletin* (Indiana).

### Do We Eat to Dye?

Cheap candies satisfy childhood's appetites for sweets, but they may prove costly in the end. This cheap candy is colored with powerful dye-materials. Prof. D. R. Hodgdon, of the State Normal School at Newark, N. J., has dressed a doll which he calls the "fraudulent Miss," to show the effect of coal-tar dyes which may be obtained from candies. Professor Hodgdon says:

"The doll is eighteen inches high. Its dress and stockings are dyed from coal-tar dye obtained from lollypops. Its shoes are blackened with lampblack obtained from licorice candy. The lampblack was extracted and used in its proper place, as shoe blacking. The shoes are made to shine with shellac which was used on peach-piths, a penny candy which may be purchased from the usual penny candy shop next to a school building. The hair was glued on with carpenter's glue obtained from 'All-Day-Suckers.' She holds in her hand a steel kitchen knife which has been copper-plated with copper obtained from a can of French peas, and beside her hangs a baby's stocking colored pink with the dye obtained from peach-pith candy."—*Bulletin* Penna. Dept. of Ag.

### Healthgrams.

A flyscreen over the food looks better than a crêpe on the door.

The registration of illness is as important as the registration of deaths.

Wild oats do not make a palatable breakfast food.

# Industrial Hygiene and Sanitation.

**Infection after Accidents.**—Of the 73,525 industrial accidents for which awards were made by the Industrial Commission of Ohio for the twelve months ending June 30, 1915, infection was reported in connection with 7,073 of this number, or, in other words, approximately one out of every ten industrial injuries become infected. It is safe to say that a reasonable effort to give injuries aseptic dressing would have saved much suffering, would have prevented a considerable number of permanent partial disabilities, and would have saved human lives.—*Bulletin of the Industrial Commission of Ohio*, Vol. 4, No. 3.

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**Some Vital Facts and Considerations in Respect to Compulsory Health Insurance.**—This report represents the arguments of Magnus W. Alexander of West Lynn, Mass., as presented at legislative hearings in New York State and in Massachusetts on March 7 and March 13, 1917, respectively.

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**Labor Legislation Enacted in New York State in 1917.**—The July Bulletin of the New York Department of Labor bears the title "Dangers in Manufacture of Paris Green and Scheele's Green." These products are manufactured by ten firms in the United States, of which seven firms are located in the State of New York. The danger lies in the fact that workmen handling the product, finished or unfinished, may contract arsenic poisoning. The bulletin gives the working conditions in the factories as found on investigation. The State Department of Labor furnishes printed notices with recommendations to employees in these establishments and to employers, as well.

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**British Explosives Factories in 1916.**—According to the *Report of the Home Office Inspectors of Explosives* for 1916, the number of new explosives factories licensed during the year was 23, making a total of 48 since the outbreak of the war. The general condition of the factories is very satisfactory, but the inspectors have considerable difficulty in impressing on the picric acid manufacturers the necessity for the strict observance of the requirements in regard to cleanliness and freedom from grit in danger buildings. The total number of accidents reported with explosives during the year was 641, as compared with 485 in 1915. The number of deaths was 195.—*The Canadian Chemical Journal*, September, 1917.

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**Industrial Efficiency and Fatigue in British Munition Factories.**—*Bulletin Number 230 of the U. S. Bureau of Labor Statistics* contains reprints of the interim report and memoranda of the British Health of Munition Workers Committee. The committee took evidence in various industrial centers from employers, representatives of workers, and other interested persons, and made numerous special studies and investigations. The committee has published up to the present time seventeen memoranda. The data collected are in all cases prejudicial to night work, which is therefore, although necessary in the present crisis, to be considered undesirable. The committee found, however, that the rate of output on the night shift is substantially the same as on the day shift, where both shifts are managed on the discontinuous system. Both men and women can more profitably be organized under the discontinuous than under the continuous system of night work. Time gained by extraordinary hours is often lost in normal hours under favorable factory conditions. The committee was impressed by the fact that earnings influence the health and efficiency of workers, and that output may be influenced by the wage system in force. Payment by the piece seems to bring a direct stimulus to bear upon the natural inclination to work. Piece rates may be expected to give a greater output than time wages. The medical examination brought out evidence of strain and fatigue, but the majority of the workers appeared to be in good health at the time of the examinations. The risk of future breakdown, however, is not negligible. The examination of women and girls emphasized the importance of adequate provision for the health and comfort of workers. Quite as important as welfare supervision and comfort of workers while on duty is the consideration of their health outside the factory.

**Rules and Regulations for the Prevention of Anthrax.**—Massachusetts has had a considerable number of anthrax cases in the past and the *Industrial Bulletin No. 6 of the Massachusetts State Board of Labor and Industries* is for this reason a very timely document. It has been prepared by Thomas F. Harrington, Deputy Commissioner of Labor, and deals with the sources of infection as well as with the prophylactic measures. Methods are given for the disinfection of hides, skins, hair, and bristles. The disinfection by the manufacturer may be dispensed with if he presents proof in writing stating that the material has been disinfected in accordance with the requirements of the United States Treasury Department or of the Massachusetts State Department of Health. The bulletin concludes with a set of rules pertaining to the sanitation of workshops and personal precautions.

*

**Carbon Monoxide Poisoning in the Steel Industry.**—In the *Technical Paper 156 of the U. S. Bureau of Mines*, I. A. Watkins sets forth briefly the liability to carbon monoxide poisoning of those employed in the various departments of a steel plant; the sources of the gas; the extent to which it is present; its effect on workers; and certain recommendations for the prevention and remedy of such conditions. The U. S. Public Health Service coöperated in this investigation. Attention was given primarily to the liability to chronic poisoning—that is, the daily exposure of employees to small quantities of the gas over an extended period of time—rather than to that of acute poisoning. Carbon monoxide is the most important of the poisonous gases encountered in the industries. Individual resistance enters largely into the results of this form of poisoning. A most serious effect of carbon monoxide is that which it has on the heart. Palpitation and distress about that organ are common complaints. After continued exposure anemia generally ensues. The efficiency of the worker is markedly decreased. In a steel plant carbon monoxide may be found about blast furnaces, gas washers, and scrubbers, gas engines, gas producers, gas boilers, cupola furnaces, dolomite furnaces, "donkey engines" or small locomotives, and "shanties" or rest rooms for employees. Watkins recommends that a survey should be made in steel plants with the view of determining whether carbon monoxide is escaping into the atmosphere breathed by workmen and some system of regular periodical inspection should be instituted. A method is given for sampling the air and determining its carbon monoxide content.

# Personal Notes.

**Members and subscribers enlisting in the Sanitary Service, or other war divisions, are respectfully requested to inform the Editor, for notice in these columns.**

Vernon Robbins, M. D., C. P. H. (Harvard-Technology), formerly of Louisville, Ky., has been appointed county and city health officer at Helena, Ark.

Mr. C. A. Abele has been appointed a chief sanitary inspector for the Red Cross service, and is stationed at Anniston, Ala.

Dr. F. M. Meader, of the New York State Health Department, has entered the army medical service with the rank of captain.

The following have been elected to membership in the American Public Health Association:

Mr. David W. Roberts, Fredericton, N. B.
J. Bernard Nelson, Ph. B., M. D., Mesa, Ariz.
Mr. C. R. Nickolls, St. Louis, Mo.
Louis Z. Normandin, M. D., New Bedford, Mass.
G. B. Schwachtgen, M. D., Aurora, Ill.
M. R. Wetmore, M. D., New York City.
Mr. Ole Salthe, Brooklyn, N. Y.
Mr. B. M. Lide, Jr., St. Louis, Mo.
Mr. Harold Macy, Geneva, N. Y.
J. A. Nydegger, A. M., M. D., Sc. D., Baltimore, Md.
Florence Brown Sherbon, A. M., M. D., Topeka, Kan.
Miss Leona Maloney, Fall River, Mass.
Mr. Paris Ripley Eastman, Albany, N. Y.

Mr. R. R. Harkness has been appointed health officer at York, Maine. He succeeds Mr. Aaron Pratt, who has been appointed a district health officer of Maine.

# Current Public Health Literature.

## AMERICAN.

### American City.

*XVII. September.*

Coöperation the Keynote in Dallas Public Health Activities.
Reconstruction and Rehabilitation Work in Europe.
Chloramine for Water Sterilization.
The Use of Ultra Violet Rays in Sterilizing Water.

### American Journal of Nursing.

*XVII. September.*

Teaching Nurses in Training the Uses and Value of Sickness Statistics. Louis I. Dublin.
Teaching in the Hospital and the Public Health Service. Elizabeth Burgess, R. N.
The Relation of the Private Duty Nurse to the Public, as a Social Worker. Marie T. Lockwood.

### Boston Medical and Surgical Journal.

*CLXXVII. August 16.*

Industrial Benzol Poisoning in Massachusetts. Thomas F. Harrington, M. D.
An Epidemic of Dysentery at the Boston State Hospital, Due to a Member of the Paratyphoid-Enteriditis Group (continued). Mary Elizabeth Morse, M. D., and Geneva Tryon, M. D.

*CLXXVII. August 23.*

The Medical Profession and Social Progress. Andrew F. Downing, M. D.
Studies of Infant Feeding: VIII. The Mineral Constituents (Ash) of Milk. A. W. Bosworth and H. I. Bowditch, M. D.
An Epidemic of Dysentery at the Boston State Hospital (concluded).

*CLXXVII. August 30.*

Uniformity in Hospital Morbidity Reports. E. A. Codman, M. D.

*CLXXVII. September 6.*

The Newer Methods of Diagnostic Technic. Frederick T. Lord, M. D.
Bruck's Sero-Chemical Test for Syphilis: A Report of Four Hundred Cases Compared with the Wassermann Reaction. Curtis E. Smith and H. C. Solomon, M. D.

### Journal of the American Medical Association.

*LXIX. September 1.*

A Report of a Group of One Hundred and Ten Cases of Poliomyelitis from the Acute Onset to the Present Time. Charles Ogilvy, M. D.
Mode of Infection, Means of Prevention, and Specific Treatment, of Epidemic Meningitis (concluded in September 8 issue). Simon Flexner, M. D.

*LXIX. September 8.*

A Simple Method of Agglutination of Meningococci. Ruth Turnacliff, M. D.
Report of an Outbreak of Diphtheric Wound Infection Among Returned Soldiers. J. G. Fitzgerald, M. B., and D. E. Robertson, M. B.

*LXIX. September 15.*

Serum Therapy for Trichinosis. Benjamin Schwartz, B. A.
The Necessity of a Pure Raw Milk. Henry Dwight Chapin, M. D.

### Journal of Bacteriology.

*II. July.*

The Importance of Uniform Culture Media in the Bacteriological Examination of Disinfectants. J. H. Wright.
Studies on the Nomenclature and Classification of the Bacteria: III. The Families of the Eubacteriales. R. E. Buchanan.
The Effect of Hydrogen Ion Concentration on the Production of Precipitates in a Solution of Peptone and Its Relation to the Nutritive Value of Media. I. J. Kligler.
Observations on the Types of Organisms Isolated from Water after Treatment with Calcium Hypochlorite. M. A. Smeeton.
The Morphology of a Strain of B. Diphtheriæ. P. G. Heinemann.
A Note on the Preparation of Hyphomycetes for Microscopical Examination. Mark F. Boyd.
Blastocystis Hominis: Its Characteristics and its Prevalence in Intestinal Content and Feces in South Carolina. Kenneth M. Lynch.
Characteristics of Coli-like Microörganisms from the Soil. B. R. Johnson and Max Levine.
The Effect of Sterilization upon Sugars in Culture Media. Courtland S. Mudge.
A Study of the Diphtheroid Group of Organisms with Special Reference to its Relation to the Streptococci. Ralph R. Mellon.

### Journal of the Outdoor Life.

*XIV. September.*

Glimpses of the Infant Consultation Clinics at Framingham, Mass.
The Framingham Health and Tuberculosis Demonstration. Donald B. Armstrong, M. D.
A Health Center in a Large City. Robert H. Bishop, Jr., M. D.
The Physiology of Worry. Irene Morton, R. N.

### Journal of Laboratory and Clinical Medicine.

*II. July.*

Cheese Poisoning. A Toxicogenic Bacillus Isolated from Cheese. William Levin, M. S. P. H.

### The Nurse.

*VI. September.*

Serum and Vaccine Therapy: I. Immunity and Vaccination. Robert Kilduff, M. D.
Hay Fever—Its Causes and Prevention. Six Engravings from Photographs.
The Nurse in Public Service. Creighton Baker, M. D.
How to Conserve the Food Supply.
Some Statistics on Diphtheria.

### New York Medical Journal.

*CVI. September 1.*

Studies in Acute Anterior Poliomyelitis. George D. Heist, M. D., Myer Solis-Cohen, M. D., and John A. Kolmer, M. D.

*CVI. September 8.*

A Plea for Early Diagnosis of Pulmonary Tuberculosis. S. A. Silk, M. D.

*CVI. September 15.*

Hygiene of Rural Schools (to be concluded). J. A. Nydegger, M. D.

### U. S. Public Health Reports.

*XXXII. August 10.*

Poliomyelitis (Infantile Paralysis) Situation.
Typhoid Fever at Nashville, Tenn.
Extra Cantonment Zone Regulations—Regulations Governing the Sale of Food and Drink in the Special Sanitary Zone around Camp Pike, near Little Rock, Ark.

*XXXII. August 17.*

Certain Military Aspects of Hookworm Disease.
Malaria in Eastern Texas—Prevalence and Geographic Distribution.
Typhoid Fever—Epidemic at Charleston, W. Va., April–June, 1917.

*XXXII. August 24.*

Poliomyelitis (Infantile Paralysis)—Its Present Prevalence in the United States.
Malaria in Tennessee—Prevalence and Geographic Distribution.
The Notifiable Diseases.

*XXXII. August 31.*

Poliomyelitis in Chosen (Korea).
The Malaria Parasite in the Mosquito—The Effects of Low Temperature and Other Factors on its Development.

*XXXII. September 7.*

Tetanus in Court-Plaster.
Rodent Destruction on Ships—A Report on the Relative Efficiency of Fumigants as Determined by Subsequent Intensive Trapping over a Period of One Year.
Tetanus in Court-Plaster—Results of the Bacteriological Examination of Fourteen Specimens.

## BRITISH.

### Journal of State Medicine.

*XXV. August, 1917.*

The Hygiene of Occupation in War Time. Prof. Thomas Oliver.
Mental States and the War—The Psychological Effects of Fear. Maj. Robert Armstrong-Jones, M. D.

### The Medical Officer.

*XVIII. August 4.*

Relation of Infant Mortality to Subsequent Mortality. Editorial.
Milk and Communicable Disease. Linsly R. Williams, M. D.

*XVIII. August 11.*

Report on Child Mortality. Editorial.
The Present Status of the Schick Test and Active Immunization with Diphtheria Toxin-Antitoxin (concluded in August 18 issue). Abraham Zingher.

*XVIII. August 18.*

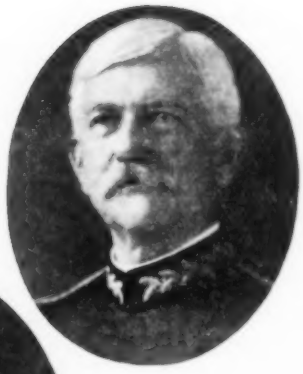
Feeding a Nation. Editorial.
Present Status of the Schick Test (concluded).

*XVIII. August 25.*

L. G. B. Housing Enquiry. Editorial.
The Carnegie Infant Welfare Scheme. Editorial.

*XVIII. September 1.*

The B. M. A. and the Ministry of Health. Editorial.
Public Health and the Disposal of the Dead. Duncan Forbes, M. D.



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# PROGRAM OF THE FORTY-FIFTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

## Washington, D. C., October 17–20, 1917

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# The American Public

## The United States of America
## The Republic of Cuba

1916

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# Health Association

## The Dominion of Canada
## The Republic of Mexico

## 1917

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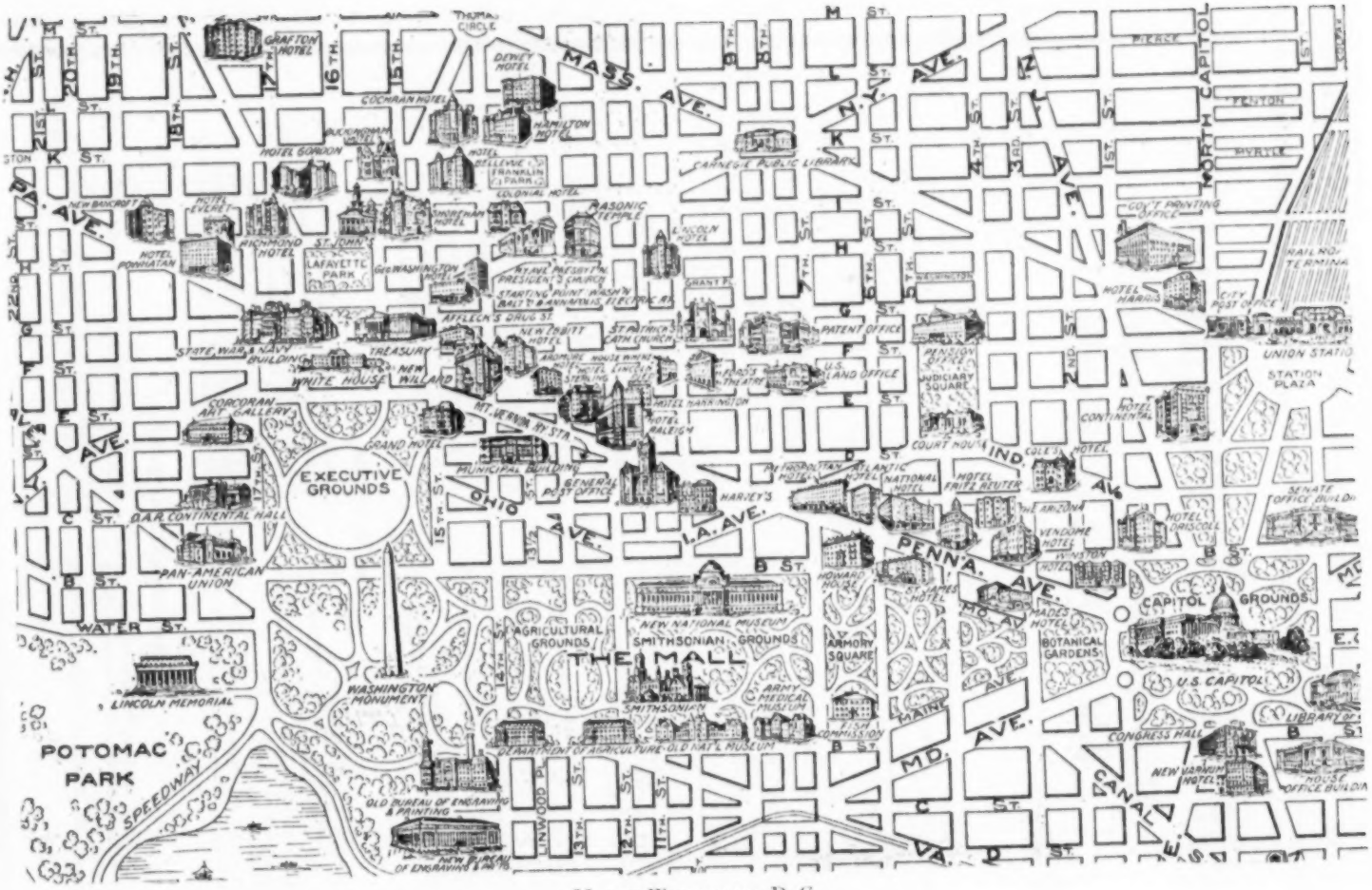
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VENDOME

## IMPORTANT ANNOUNCEMENT REGARDING HOTELS.

On September 22, inquiry was made of twenty-five Washington hotels regarding available accommodations. Of sixteen replies received, the New Willard, Raleigh, Harrington, and Capitol Park report that they are completely booked for October 17–20.

The New Ebbitt has no single rooms, but could accommodate quite a number in double rooms.

BELLEVUE: "Unable to promise, but will do our best upon arrival."

ST. JAMES: "Cannot guarantee a great number, but will give requests immediate attention."

STERLING: "Only a small number of rooms, but will try to oblige."

NATIONAL: "Don't know. Send your people and we will try to take care of them."

DEWEY: "About 20 rooms."

CONGRESS HALL: "30 to 60. If Congress adjourns, from 100 to 150."

GEORGE WASHINGTON INN: "About 10 double rooms."

CONTINENTAL: "About 25."

ATLANTIC AND BANCROFT: "8 or 10."

LAFAYETTE: "Cannot promise, but will try to take care of you."

METROPOLITAN: "Will be pleased to take care of all reservations made."

A more complete list of hotels is given in the September JOURNAL.

In reserving accommodations, state whether a single or double room is wanted. Prospects seem best in the case of double rooms. Also indicate whether bath is demanded.

**Mr. Thomas Grant, of the Chamber of Commerce, Washington, D. C., has kindly offered to fill the requirements of prospective guests who write to him. In writing, please enclose a stamped envelope for reply, state the price you wish to pay, and give the other information referred to above.**

Some members will choose to reserve accommodations in Baltimore hotels, which are not so crowded. It is quite likely, also, that Mr. Grant will be able to arrange with dormitories, or private rooming houses.

If Congress adjourns before October 17,—and that seems highly probable,—more rooms will be available. At any rate, the necessity is apparent of applying for reservations at once.

## HEADQUARTERS.

Headquarters will be on the Mezzanine Floor of the New Willard Hotel. All guests are requested to register, whether members or not. Programs for all, and badges for members will be given out upon registration. Announcements will also be posted here, and descriptive booklets regarding the places of interest in Washington will be presented to guests.

Wednesday morning, October 17, has been especially set aside for registration, although Headquarters will be open throughout the Sessions.

## EXHIBITS.

Commercial exhibits will be found in and near the Crystal Room of the New Ebbitt Hotel. Prospective exhibitors are directed to the manager of the Hotel for space and rates.

## A WORD OF CAUTION.

At the last Annual Meeting of the Association several members were swindled by cashing checks for a wily stranger. Our members are cautioned. Courtesy always; but safety first!

## PUNCTUALITY.

All meetings will begin at 9:00 A. M., 2:00 P. M., and 7:45 P. M. Members and guests are earnestly requested to arrive five minutes before, rather than after the stated time for opening meetings. Tardiness is an imposition upon both audience and speaker.

## ADVISORY COUNCIL.

Attention is drawn to the following extracts from Constitution and By-Laws concerning the Advisory Council:

### Article V. Constitution.

*Advisory Council.* Nominations of officers and directors shall be made by an Advisory Council. The Advisory Council shall consist of one representative from each state, province, territory, or district; one from each army and navy medical and hygienic board; and one from each federal department or bureau of the nations represented in the Association, dealing with phases of public health; together with one representative not otherwise eligible, to be elected annually by each section of the Association. Provided, that this article shall not be construed to deprive any member of the Association of his right to make nominations.

### Article 2. By-Laws.

#### ADVISORY COUNCIL.

Each member of the Advisory Council representing a state, province, territory or district shall be elected by the members of the Association resident in the jurisdiction which he represents, either before or at the annual meeting. His election shall be reported in writing to the secretary, and he shall hold office until the next annual meeting and until his successor is elected. In the event of the failure of any such jurisdictional group so to report, the executive committee shall appoint a representative *pro tem.*

In accordance with the foregoing, on Thursday at noon, after the address of Mr. Hoover, members will group themselves in the Small Ball Room at the New Willard, in order to elect representatives to the Advisory Council.

The Advisory Council will meet in the Onyx Room, New Ebbitt Hotel, on Friday, October 19, and there choose nominees for the offices of president, three vice-presidents, treasurer, and ten directors.

## BOARD OF DIRECTORS.

The Board of Directors consists of the officers, all ex-presidents, a member designated annually by each section, and thirty additional directors, who serve for three years. Ten of these are elected by the Association each year.

The administrative affairs of the Association are entrusted to this body. In Washington the Board of Directors will have three important sessions on Wednesday, October 17, at 9:00 A. M., 2:00 P. M., and at 7:45 P. M. As business of the most vital importance to the Association will be taken up, President Evans asks that all directors attend these meetings without fail.

### ENTERTAINMENT OF LADIES.

For the ladies, the special entertainment feature will be an automobile ride through the parks, followed by a luncheon.

### CHANGES IN PROGRAM.

In order that this number of the JOURNAL might appear promptly, it was necessary to send the forms to press several days earlier than was originally expected. The final program to be issued at the meeting will have a number of changes and additions.

## PROGRAM OF THE GENERAL SESSIONS.

### FIRST SESSION.

*Thursday, October 18, 11:30 A. M.*
*New Willard Hotel, Small Ball Room.*

All Sections will adjourn at 11:25 A. M. in order to enable the members to assemble for this general session.

Address. HERBERT C. HOOVER, *Director, U. S. Food Administration.*

*Election of Advisory Council.*

After this address the members will group themselves in this room by States, Provinces, and Districts in order to select their respective members to the Advisory Council. The elected members should be reported in writing to the Secretary at headquarters not later than Thursday at 3:00 P. M.

Vacancies in the Advisory Council at 3:00 P. M. on Thursday, October 18, will be filled *pro tempore*, by the Executive Committee in accordance with the by-laws of the Association.

The Advisory Council will meet on Thursday, October 18, at 5:00 P. M., in order to make nominations for a president, three vice-presidents, and a treasurer. These nominations will be acted upon by the Association at its final session, Saturday, October 20, at 2:00 P. M.

### SECOND SESSION.

*Thursday, October 18, 7:45 P. M.*
*New National Museum, Auditorium.*

Presidential Address. DR. W. A. EVANS.

Address. W. C. GORGAS, *Surgeon-General, U. S. A.*

Address. W. C. BRAISTED, *Surgeon-General, U. S. N.*

Address. DR. FRANKLIN H. MARTIN, *Chief of Medical Commission, Council of National Defense.*

Address. DR. W. H. FROST, *Director, Bureau of Sanitary Service, American Red Cross.*

*A reception will follow these addresses.*

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

THIRD SESSION.

*Friday, October 19, 9:00 A. M.*
*New Willard Hotel, Small Ball Room.*

Under the Auspices of the Sociological Section.

*Important Medical Problems of the World War.*

Tuberculosis and the War. DR. HERMANN M. BIGGS, *Commissioner of Health of New York State; Member of the General Medical Board of the Council of National Defense.*

Venereal Diseases and the War. W. C. GORGAS, *Surgeon-General, U. S. A.*

The Rehabilitation and Reëducation of Diseased and Injured Soldiers. MAJOR-GENERAL JOEL E. GOLDTHWAITE, *of the Surgeon-General's Staff.*

FOURTH SESSION.

*Friday, October 19, 7:45 P. M.*
*New National Museum, Auditorium.*

Sanitation in the Forward Areas in the War. COL. T. H. GOODWIN, *C. M. G., D. S. O., R. A. M. C., of the English Army.*

Address. J. W. TRASK, *Assistant Surgeon-General, U. S. P. H. S.*

Army Sanitation. SURGEON-MAJOR EDOUARD RIST, *French Scientific Mission.*

War and Mental Diseases. MAJOR PEARCE BAILEY, *U. S. A.*

War Sanitary Problems in Canada. MAJOR J. W. S. MCCULLOUGH, *Chief Officer of Health, Provincial Board of Health, Toronto, Ontario.*

FIFTH SESSION (FINAL).

*Saturday, October 20, 2:00 P. M.*
*New National Museum, Auditorium.*

Election of Association Officers.

Ten-minute Résumés of Section Chairmen Relative to Section War Conferences and Important Papers Read in Section Meetings.

Maintaining the Health of British Soldiers. COL. GEO. B. NASMITH, *Canadian Expeditionary Force.*

Report of Committee on Social Insurance.

Report of Committee on Public Health Education. DR. MARK F. BOYD.

Report of the Committee on Cold Storage.

Report of the Committee on Regulations Concerning the Production and Sale of Milk.

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

# PROGRAM OF THE SECTION ON PUBLIC HEALTH ADMINISTRATION.

*Chairman*, DR. E. C. LEVY, *New York City.*
*Vice-Chairman*, DR. FRANCIS G. CURTIS, *West Newton, Mass.*
*Secretary*, CHESTER H. WELLS, *Montclair, N. J.*

FIRST SESSION.

*Wednesday, October 17, 2:00 P. M.*
*New Willard Hotel, Small Ball Room.*

Minutes of last annual meeting.

Introduction of new business to be considered by the section before final adjournment.

Appointment of nominating committee.

Report of Committee on Standardizing the Work of Public Health Officials. DR. JAMES F. MCCRUDDEN, *Philadelphia, Pa.*

*Symposium on Rural Health Administration.*

Statistical Evidence on the Need of Efficient Rural Health Administration. DR. FREDERICK L. HOFFMAN, *Newark, N. J.*

Discussion (five minutes): Opened by DR. JOHN T. BLACK, *Hartford, Conn.*; DR. SAMUEL J. CRUMBINE, *Topeka, Kan.*; DR. L. L. LUMSDEN, *Washington, D. C.*

Rural Health Administration under the State Health District Plan. DR. FREDERICK W. SEARS, *Syracuse, N. Y.*

Discussion (five minutes): Opened by DR. CHARLES E. SIMPSON, *Lowell, Mass.*

Rural Health Administration under the Coöperative and Local Health District Plan. DR. G. F. RUEDIGER, *La Salle, Ill.*

Discussion (five minutes): Opened by MR. ROBERT N. HOYT, *San Jose, Cal.*

The Evolution of County Health Work. DR. W. S. RANKIN, *Raleigh, N. C.*

Discussion (five minutes): Opened by DR. JOHN A. FERRELL, *New York City.*

Coöperation in City, State and Federal Food and Drug Control. DR. CARL W. ALSBERG, *Washington, D. C.*

Discussion (five minutes): Opened by DR. R. B. FITZ RANDOLPH, *Trenton, N. J.*; DR. H. E. BARNARD, *Indianapolis, Ind.*

Hay Fever Prevention as a National Problem. DR. W. SCHEPPEGRELL, *New Orleans, La.*

SECOND SESSION.

*Thursday, October 18, 2:00 P. M.*
*New Willard Hotel, Small Ball Room.*

WAR PROGRAM.

Joint Meeting with the American Social Hygiene Association and the Sociological Section of A. P. H. A.

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

Chairman's Address. Some Public Health Problems of the Present War. Dr. E. C. Levy, *New York City.*

Report of Committee on Venereal Diseases. Dr. W. F. Snow, *New York City.*

*Symposium on Venereal Disease Control in the Army, the Navy, and the Civilian Community.*

Colonel F. F. Russell, *U. S. A.*
Surgeon Richmond Holcomb, *U. S. N.*
Mr. Raymond B. Fosdick, *Commission on Training Camp Activities.*
Assistant Surgeon-General J. W. Kerr, *U. S. P. H. S.*
Dr. Wade H. Frost, *Director of the Red Cross Sanitary Service.*

Theory and Practice in Vital Statistics. Dr. T. D. Tuttle, *Seattle, Wash.*

Discussion (five minutes): Opened by Dr. Knud Stoumann, *Newark, N. J.*

Report of Nominating Committee.

Third Session.

*Friday, October 19, 2:00 P. M.*
*New National Museum, Auditorium.*

Report of Committee to Formulate Minimum Requirements for the Control of the Common Communicable Diseases. Dr. Haven Emerson, *New York City.*

(This committee has done a large amount of work during the year and its report should be of the greatest interest to every health official. At least one hour will be given to the discussion of this report.)

Report of Committee on Rural Health Administration. Dr. Gustav F. Ruediger, *La Salle, Ill.*

Other Committee Reports.

A Tuberculosis Survey in Chicago. Dr. J. D. Robertson, *Health Commissioner, Chicago, Ill.*

What We Are Doing to Prevent Tuberculosis Among Children. Address by a representative of the New York City Department of Health.

Discussion (five minutes): Opened by Dr. Francis X. Mahoney, *Boston, Mass.;* Dr. Francis E. Fronczak, *Buffalo, N. Y.;* Dr. Charles J. Hastings, *Toronto, Can.;* Dr. John H. Landis, *Cincinnati, Ohio;* Dr. J. D. Robertson, *Chicago, Ill.*

Note.—Every health officer who has any suggestion to make should consider it his duty to take part in this important discussion, so that all members of the Section may be stimulated to take every known step to combat this disease.

*Symposium on Public Health Publicity and Education.*

Publicity in Health Matters a Public Right. Dr. Oscar W. Dowling, *New Orleans, La.*

The Health Department and the Citizen. Publicity as a Factor in Their Better Coöperation. Dr. John W. Trask, *Washington, D. C.*

Public Health Publicity and Education through the Public Schools. Dr. Ira S. Wile, *New York City.*

Moving Pictures in Health Education. Dr. Charles F. Bolduan, *New York City.*

FOURTH SESSION.

*Saturday, October 20, 9:00 A. M.*
*New Ebbitt Hotel, Crystal Room.*

Committee reports.
Round table discussion.
Five-minute speeches.
Election of officers.

Camp Sanitation. MAJOR FITZGERALD, *Toronto, Can.*

The Red Cross as a Public Health Agency. DR. W. H. FROST, *Washington, D. C.*

My Most Interesting Experience as a Public Health Officer.

Discussion (five minutes): Opened by DR. CHARLES J. HASTINGS, *Toronto, Can.*; DR. CARL E. BUCK, *Oak Park, Ill.*; DR. CHAS. V. CHAPIN, *Providence, R. I.*; DR. ARCHABALD CHEATHAM, *Durham, N. C.*; DR. JAMES C. COFFEY, *Worcester, Mass.*; MR. MAX J. COLTON, *Cumberland, Md.*; DR. CHAS. V. CRASTER, *Newark, N. J.*; DR. FRANCIS E. FRONCZAK, *Buffalo, N. Y.*; DR. GEORGE W. GOLER, *Rochester, N. Y.*; DR. JOHN H. LANDIS, *Cincinnati, Ohio*; DR. FRANCIS X. MAHONEY, *Boston, Mass.*; DR. JOHN D. ROBERTSON, *Chicago, Ill.*; DR. P. S. SCHENCK, *Norfolk, Va.*; DR. FRANK W. WRIGHT, *New Haven, Conn.*

My Most Interesting Experience in Connection with Public Health Work.

Discussion: Opened by DR. JOS. GOLDBERGER, *Washington, D. C.*; MR. LUCIUS P. BROWN, *New York City*; DR. S. J. CRUMBINE, *Topeka, Kan.*; DR. A. J. DOUGLAS, *Winnipeg, Can.*; DR. J. N. HURTY, *Indianapolis, Ind.*; DR. S. L. JEPSON, *Charleston, W. Va.*; DR. GRACE L. MEIGS, *Washington, D. C.*; DR. F. MONTIZAMBERT, *Ottawa, Can.*; DR. CHARLES E. NORTH, *New York City*; DR. HERBERT D. PEASE, *New York City*; DR. W. A. SAWYER, *Sacramento, Cal.*

## PROGRAM OF THE SECTION ON INDUSTRIAL HYGIENE.

*Chairman*, DR. E. R. HAYHURST, *Columbus, Ohio.*
*Vice-Chairman*, DR. G. M. PRICE, *New York City.*
*Secretary*, DR. J. W. SCHERESCHEWSKY, *Pittsburgh, Pa.*

FIRST SESSION.

*Wednesday, October 17, 2:00 P. M.*
*New Ebbitt Hotel, White Parlor.*

Committee report.

The Need for a General System of Sanitary Supervision of Industries in Times of War. DR. E. R. HAYHURST, *Columbus, Ohio.*

General Measures for the Prevention and Control of Industrial Diseases in War Industries. DR. ALFRED STENGEL.

Plan for Coöperation of Federal and State Authorities in the Sanitation of Industries. DR. FRANCIS D. PATTERSON, *Harrisburg, Pa.*

Practical Standards for Factory Sanitation. DR. G. M. PRICE, *New York City.*

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

SECOND SESSION.

*Thursday, October 18, 9:00 A. M.*
*New Ebbitt Hotel, White Parlor.*

Committee report.

Community Sanitation in Time of War. DR. GEORGE M. KOBER, *Washington, D. C.*

Necessary Standards of Medical Supervision in Maintaining the Health of Employees. DR. OTTO P. GEIER, *Cincinnati, Ohio.*

Prophylaxis of Industrial Poisoning in the Munitions Industries. DR. ALICE B. HAMILTON, *Chicago, Ill.*

Practical Points in the Safe Handling of T. N. T. and Allied Explosives. DR. W. G. HUDSON.

Industrial Toxic Jaundice. DR. J. W. SCHERESCHEWSKY, *Pittsburgh, Pa.*

**(This meeting will close promptly at 11.25 A. M. to permit members to hear Mr. Hoover and to attend the election of the Advisory Council at the New Willard Hotel, Small Ball Room.)**

THIRD SESSION.

*Thursday, October 18, 2:00 P. M.*
*New Ebbitt Hotel, White Parlor.*

Election of officers.

Committee report.

Practical Standards of Factory Illumination. L. B. MARKS.

Standards for the Prevention of Compressed Air Illness. SEWARD ERDMAN.

Heating and Ventilating Standards. D. D. KIMBALL, *New York City.*

Practical Standards for the Ventilation of the Air of Workrooms. MISS J. J. LYLE, *Lexington, Ky.*

Method of Counting Dust and Synthetic Air Chart for Ventilation Determinations. DR. E. V. HILL, *Chicago, Ill.*

FOURTH SESSION.

*Friday, October 19, 2:00 P. M.*
*New Willard Hotel, Small Ball Room.*

Joint Meeting with the Sociological Section.

Considerations Affecting the Replacement of Men by Women in War Industries. JOSEPHINE GOLDMARK.

Industrial Fatigue,—Its Relation to War Industries, Some Methods for Its Reduction. PROF. FREDERIC S. LEE.

Methods for Field Study of Industrial Fatigue. P. SARGENT FLORENCE.

The Status of our Knowledge in Regard to Fatigue "Toxins." PROF. ERNEST L. SCOTT, *Columbus, Ohio.*

The Heat Hazard, Methods for its Mitigation. J. A. WATKINS, *P. A. Surgeon, U. S. P. H. S.*

Conference on War Problems and Opportunities.

FIFTH SESSION.

*Saturday, October 20, 9:00 A. M.*
*New Willard Hotel, Small Ball Room.*

A round table discussion by representatives of manufacturers in the explosives and munitions industries, concerning the conservation of the health of workers, under the auspices of the Committee on Sanitation of the Advisory Committee on Labor, National Council of Defense.

This will probably be followed by a luncheon in the same room. Tickets may be obtained on Friday at the Headquarters.

## PROGRAM OF THE LABORATORY SECTION.

*Chairman*, PROF. HENRY ALBERT, *Iowa City, Iowa.*
*Vice-Chairman*, DR. D. L. HARRIS, *St. Louis, Mo.*
*Secretary*, DR. CHAS. KRUMWIEDE, JR., *New York City.*

FIRST SESSION.

*Thursday, October 18, 2:00 P. M.*
*New National Museum, Auditorium.*

Chairman's Address. Service of Health Laboratories in Time of War. HENRY ALBERT, *Iowa City, Iowa.*

War Activities of the Bacteriological Laboratories in France and England. WM. H. PARK, *New York City.*

The Work of a Mobile Army Laboratory in France. COL. GEO. F. NASMITH, *Canadian Expeditionary Force, Toronto, Can.*

Experimental Work on the Comparative Value of Dakin's Solution and Tincture of Iodine. H. D. PEASE, *New York City.*

Studies of a Regimental Epidemic of Bacillus Paratyphosis with Special Reference to the Efficient Disposal of Large Numbers of Specimens. MARY NEVIN, *Albany, N. Y.*

Experiences with the New Standard Methods of Water Examination. H. E. HAZELTINE, *Washington, D. C.*

Report of the Committee on Bacterial Methods for the Examination of Water.

The Preparation of Typhoid and Paratyphoid Vaccines as Used in the United States Army. GUTHRIE MCCONNELL, *Washington, D. C.*

SECOND SESSION.

*Friday, October 19, 9:00 A. M.*
*New Ebbitt Hotel, Crystal Room.*

Committee reports.

Fecal Examination for Typhoid and Paratyphoid Bacilli with Special Reference to Normal or Contact Carriers. CHAS. KRUMWIEDE, JR., *New York City.*

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

Effect of Concentration of Glucose and Lactose on the Viability of the Colon-cloacæ Group. MAX LEVINE and HELEN A. BURLING, *Ames, Iowa.*

Differentiation of B. Coli and B. Aerogenes on Solid Media. MAX LEVINE, *Ames, Iowa.*

Results of Work on Poliomyelitis. E. C. ROSENOW, *Rochester, Minn.*

Technique of Demonstration and Isolation of Tetanus Bacilli. J. P. LEAKE, *Washington, D. C.*, and H. B. CORBITT, *Washington, D. C.*

The Sanitary Significance of Chemical Determinations in the Analysis of Water from Wells and Springs to be Used for Drinking Purposes. W. D. STOVALL, *Madison, Wis.*

The Influence of Plankton Animals upon Bacterial Death Rates. (Illustrated with lantern slides.) W. C. PURDY, *Plankton Expert, U. S. P. H. S.*, and C. T. BUTTERFIELD, *Sanitary Bacteriologist, U. S. P. H. S.*

Final Report of Committee on Bacterial Methods of Milk Analysis. (For Discussion and Adoption.)

THIRD SESSION.

*Saturday, October 20, 9:00 A. M.*

*New National Museum, Auditorium.*

Committee reports.

Election of officers.

Comparative Wassermann Tests with Two Antigens. ANNA I. VANSAUN and MARGARET K. PRESTON, *Albany, N. Y.*

A Method for the Colorimetric Estimation of Small Amounts of Aniline. ELIAS ELVOVE, *Washington, D. C.*

American Pellagra Mortality During 1915 and 1916. WM. F. PETERSON, *Chicago, Ill.*

Standardization of Disinfectants. ARTHUR L. WALTERS, *Indianapolis, Ind.*

Final Report by the Committee on Standardization of Disinfectants.

The Possible Application of the Macroscopic Slide Agglutination in the Search for Meningococcus Carriers. CHAS. KRUMWIEDE, JR., *New York City.*

The Hydrogen Ion. EARLE B. PHELPS, *Washington, D. C.*

Hydrogen Ion Concentration and Toxigenicity of B. Diphtheriæ. LEWIS DAVIS, *Detroit, Mich.*

The Mobile Unit of the Laboratory of the New York State Department. AUGUSTUS B. WADSWORTH, *Albany, N. Y.*

Notes on an Epidemic of Bacillary Dysentery. AUGUSTUS B. WADSWORTH, *Albany, N. Y.*

Standardization of Anti-Typhoid Vaccine. G. W. MCCOY, *Washington, D. C.*

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

## PROGRAM OF THE SECTION ON SANITARY ENGINEERING.

*Chairman*, MR. THEODORE HORTON, *Albany, N. Y.*
*Vice-Chairman*, MR. GEO. S. WEBSTER, *Philadelphia, Pa.*
*Secretary*, DR. H. D. PEASE, *New York City.*

*Thursday, October 18, 2:00 P. M.*
*New Ebbitt Hotel, Red Parlor.*

Committee on Air Supplies. DR. FREDERIC H. BASS, *Chairman.*

Committee on Sewerage and Sewage Disposal. MR. GEORGE S. WEBSTER, *Chairman.*

Committee on Sanitary Control of Waterways. Mr. HARRISON P. EDDY, *Chairman.*

a. Fundamental Principles of Sanitary Control of Waterways.
b. Code of Regulations for the Sanitary Control of Waterways.

Committee on Refuse Collection and Disposal. MR. SAMUEL A. GREELEY, *Chairman.* Also the following papers:

a. Relation of State Health Departments to Municipal Refuse Collection and Disposal. MR. EDWARD D. RICH.
b. Effect of the War on the Production of Garbage and the Methods of Disposal. MR. I. S. OSBORNE.

Committee on Works Operation and Analytical Methods. MR. WM. L. STEVENSON, *Chairman.*

Committee on Plumbing and Drainage of Buildings. Preliminary Report. MR. CHESTER H. WELLS, *Chairman.*

Some Conclusions Reached Concerning the Treatment of Sewage by the Activated Sludge Process. MR. T. CHALKLEY HATTON.

Mosquito Control in New Jersey under the County Commission Law. DR. RALPH H. HUNT.

Notes on Activated Sludge, with Particular Reference to Treatment of Packingtown Wastes. MR. LANGDON PEARSE.

The Ventilation of Army Barracks. MR. W. J. MAUER, *Chicago, Ill.*

## PROGRAM OF THE SECTION ON VITAL STATISTICS.

*Chairman*, DR. JOHN W. TRASK, *Washington, D. C.*
*Vice-Chairman*, DR. W. J. V. DEACON, *Topeka, Kan.*
*Secretary*, R. C. LAPPIN, *Washington, D. C.*

(There will be a special meeting of the section to consider the new problems in connection with the registration of births and deaths and the notification of disease brought about by our entrance into the war.)

*All sessions to be held at the New Ebbitt Hotel in the Red Drawing Room.*

FIRST SESSION.
*Wednesday, October 17, 2:00 P. M.*

Morbidity Reports and Records of the Army. COL. F. P. REYNOLDS, *U. S. Army.*

Morbidity Reports and Records of the Navy. SURGEON J. R. PHELPS, *U. S. Navy.*

Morbidity Reports and Records of Extra Cantonment Zones. Assistant Surgeon-General John W. Trask, *U. S.*

Deaths from Puerperal Causes. W. J. V. Deacon.

The Significance of "Standardized" or "Corrected" Death-Rates. Walter F. Wilcox.

Election of Nominating Committee.

Report of the Committee on Membership. Charles F. Bolduan.

Report of the Committee on the Accuracy of Certified Causes of Death and Its Relation to Mortality Statistics and the International List. Haven Emerson, *Chairman.*

Second Session.

*Thursday, October 18, 9:00 A. M.*

Report of Nominating Committee and Election of Officers and Section Council.

Notification of Disease and the Protection of the Troops—What the Several State Health Departments are Doing to Prevent the Spread of Disease during Mobilization. Report of the Committee on Morbidity Reports and Statistics. A. J. Chesley, *Chairman.*

The Need for Morbidity Statistics of War Industries. B. S. Warren.

What a System of Good Hospital Morbidity Statistics would Accomplish in the Study of Maternal Mortality and Puerperal Sepsis Considered as a Public Health Problem. Barton Cooke Hirst.

Hospital Statistics as an Aid in Public Health Administration—The Philadelphia Plan. Charles Scott Miller.

The Need for Comparable Morbidity Statistics of Penal Institutions. Edwin W. Kopf.

Uniform Statistics of Mental Diseases. Horatio M. Pollock.

Report of Committee on Institutional and Hospital Statistics. Frederick L. Hoffman, *Chairman.*

**(The meeting will close promptly at 11:25 A. M., in order to permit members to hear Mr. Hoover at the New Willard Hotel, Small Ball Room, and to assemble for the election of the Advisory Council.)**

Third Session.

*Friday, October 19, 2:00 P. M.*

Comparability—The Mortality Statistics Will O' the Wisp. George H. Vanburen.

A Proposal for the Promotion of Vital Statistics Education in the United States. Edwin W. Kopf.

Report of the Committee on the 1920 Census and Its Relation to Vital Statistics. Wm. H. Guilfoy.

Report of the Committee on Legislation. C. V. Chapin.

Report of the Committee on Forms and Methods of Statistical Practice. Walter F. Willcox, *Chairman.*

Report of the Committee on Investigations in Registration and Vital Statistics Problems. Wilmer R. Batt, *Chairman.*

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

Report of the Committee on Constitution. CHARLES F. BOLDUAN.

Report of Committee on Non-Resident Deaths. WILMER R. BATT, *Chairman.*

FOURTH SESSION.

*Saturday, October 20, 9:00 A. M.*

Report of Section Council and Nomination of Standing Committees for Ensuing Year.

Reports of other committees.

Pellagra Experience.

Report of Committee on the Accuracy of Certified Causes of Death and Its Relation to Mortality Statistics and the International List (concluded from First Session). HAVEN EMERSON, *Chairman.*

Report of Committee on Amendments to the Standard Certificate of Death. W. H. DAVIS, *Chairman.*

Unfinished business.

## PROGRAM OF THE SOCIOLOGICAL SECTION.

*Chairman*, DR. DONALD B. ARMSTRONG, *Framingham, Mass.*
*Vice-Chairman*, DR. WILLIAM F. SNOW, *Washington, D. C.*
*Secretary*, DR. LOIS I. HARRIS, *New York City.*

FIRST SESSION.

*Thursday, October 18, 2:00 P. M.*

Joint Session with Public Health Administration Section. See program on page 891.

SECOND SESSION.

*Friday, October 19, 9:00 A. M.*
*New Willard Hotel, Small Ball Room.*

A General Session under the auspices of Sociological Section. See the program on page 890.

THIRD SESSION.

*Friday, October 19, 2:00 P. M.*
*New Willard Hotel, Small Ball Room.*

Joint Session with Industrial Hygiene Section. See page 894 for program.

FOURTH SESSION.

*Saturday, October 20, 9:00 A. M.*
*New Ebbitt Hotel, White Parlor.*

CONFERENCE ON WAR PROBLEMS AND OPPORTUNITIES.

Report of committees.

Conference on War Problems and Opportunities.

Election of officers.

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

# PROGRAM OF THE FOOD AND DRUGS SECTION.

*Chairman*, MR. LUCIUS P. BROWN, *New York City.*

FIRST SESSION.

*Thursday, October 18, 9:00 A. M.*
*New Ebbitt Hotel, Crystal Room.*

Reports of Committees on: Nutritional Problems; Relation of Foods to Disease; Control of Milk and Dairy Products.

Problem of Increased Production of Milk and Dairy Products. PROF. FRED. E. RASMUSSEN, *Pennsylvania State College, Philadelphia, Pa.*

Maintenance of Economy and Quality in Distributing Market Milk. MR. LOTON HORTON, *Pres., Sheffield-Farms, S. D. Milk Co., New York City.*

Influence of Heat on Growth-Promoting Properties of Food. DR. E. V. MCCOLLUM, *Johns Hopkins University, Baltimore, Md.*

Bacterial Contamination of Foods from Exposure to Dust. DR. WM. E. PARK, *Director, Bureau of Laboratories, Department of Health, City of New York.*

**(The meeting will close promptly at 11:25 A. M., in order to permit members to hear Mr. Hoover at the New Willard Hotel, Small Ball Room, and to assemble for the election of the Advisory Council.)**

SECOND SESSION.

*Friday, October 19, 2:00 P. M.*
*New National Museum Auditorium.*

*Symposium on Foods and Drugs as Related to War Problems.*

Reports of Committees on: Cold Storage; Problems of Canning; Retail Distribution and Marketing of Foods; Conservation and Development of Food Supplies; Preparation, Packing and Transportation of Foods.

Address of Chairman. What Our Members Can Do.

Cold Storage—Its Capabilities and How to Best Utilize and Extend Them MR. FRANK A. HORNE, *Pres., Merchants Refrigerating Co., New York City.*

The Present Status of the Preservation of Foods by Canning and the Possibilities of Increase. Mr. F. S. GORRELL, *Sec., National Canners' Assn., Washington, D. C.*

War-Time Foods from Poultry and How Production May Be Increased. DR. RAYMOND PEARL, *U. S. Food Administration, Washington, D. C.*

Fruits in War-Time; Their Distribution and the Possible Greater Development of Production. MR. G. H. POWELL, *U. S. Food Administration, Washington, D. C.*

Cereal Production, Distribution and Conservation. DR. W. A. TAYLOR, *Chief, Bureau of Plant Industry, U. S. Dept. of Agriculture, Washington, D. C.*

**All papers positively limited to 15 minutes; discussion to 5 minutes.**

THIRD SESSION.

*Saturday, October 20, 9:00 A. M.*
*New National Museum, Committee Room.*

Reports of Committees on: Municipal Food Administration; Drugs and Nostrums; Meat Inspection; Habit-Forming Drugs.

Election of Section Officers.

The Duty of Municipal Food Departments in Modern War. MR. OLE SALTHE, *Asst. Director, Bureau of Food and Drugs, Department of Health, City of New York.*

The Nostrum Fakir and the Soldier. MR. JOHN PHILLIPS STREET, *Chemist in Charge, Analytical Laboratory, Agricultural Experiment Station, New Haven, Conn.*

Drug Diseases and Wars. DR. EDWARD GUION, *Atlantic City, N. J.*

NOTE.—Other papers have been requested and will appear on final program.

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The North Atlantic Tuberculosis Conference will be held at Baltimore, October 17–18. Secretary, Dr. Philip P. Jacobs, 105 East 22nd Street, New York City. Our members are invited to attend.

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The A. A. S. P. of Infant Mortality Convention meets at Richmond, Va., October 15–17. Executive Secretary, Gertrude B. Knipp, 1211 Cathedral Street, Baltimore, Md. A. P. H. A. members are invited to attend.

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OUR NATIONAL CAPITOL

The seat of government for one hundred million people. Seventy-four years in process of construction, cost over sixteen million dollars, covers nearly four acres. Dome of cast iron, weighs forty-five hundred tons. Building contains Senate Chamber and House of Representatives, President's, Vice-President's, and Speaker's Rooms, Hall of Statues, and Committee Rooms.

## TABULAR VIEW OF ALL MEETINGS.

| SESSIONS | Wednesday, Oct. 17 | | | Thursday, Oct. 18 | | | Friday, Oct. 19 | | | Saturday, Oct. 20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9:00 A. M. | 2:00 P. M. | 7:45 P. M. | 9:00 A. M. | 2:00 P. M. | 7:45 P. M. | 9:00 A. M. | 2:00 P. M. | 7:45 P. M. | 9:00 A. M. | 2:00 P. M. |
| General Sessions | | | | I Willard* S. B. R. 11:30 A. M. | | II Nat'l† Museum Aud. | III Willard S. B. R. | | IV Nat'l Museum Aud. | | V Nat'l Museum |
| Public Health Administration | | I Willard* S. B. R. | | | II Joint Session Willard S. B. R. I | | | III Nat'l Mus. Aud. | | IV Ebbitt Crystal Room | |
| Sociology | | | | | | | II Willard S. B. R. | III Joint Session Willard S. B. R. IV | | IV Ebbitt White Parlor | |
| Industrial Hygiene | | I Ebbitt White Parlor | | II Ebbitt White Parlor | III Ebbitt White Parlor | | | | | V Willard S. B. R. | |
| Vital Statistics | | I Ebbitt Red Parlor | | II Ebbitt Red Parlor | | | | III Ebbitt Red Parlor | | IV Ebbitt Red Parlor | |
| Laboratory | | | | | I Nat'l Museum Aud. | | II Ebbitt Crystal Room | | | III Nat'l Museum Aud. | |
| Food and Drugs | | | | I Ebbitt Crystal Room | | | | II Nat'l Museum Aud. | | III Nat'l Museum Com. Rm. | |
| Sanitary Engineering | | | | | I Ebbitt Red Parlor | | | | | | |
| Board of Directors | I Onyx Room, Ebbitt | II Onyx Room, Ebbitt | III Onyx Room, Ebbitt | | | | | | | | |
| Advisory Council | | | | Election Willard S. B. R., 12:00 M. | | | | Ebbitt Onyx Room 5:00 P. M. | | | |
| Entertainment‡ | | | | | | | | | | | |

Registration—New Willard Hotel, Mezzanine Floor

Committee Meetings

Sections adjourn at 11:25 A. M.

*Willard, S. B. R.—New Willard Hotel, Small Ball Room.
†National Museum Aud.—New National Museum Auditorium.
‡For the ladies there will be an automobile ride through the parks, followed by a luncheon. The date will be announced in the final program.

THE WHITE HOUSE

The finest residence in the finest residential city in America. Site selected and corner-stone laid by George Washington. John Adams, in 1800, was the first occupant. Burnt by the British in 1814. When rebuilt, the Virginia freestone was painted white in order to obliterate the marks of the fire.

MOUNT VERNON

Alexandria, Va.
Reached by trolley, boat, or auto

Our "National Shrine," sixteen miles south of Washington, on the Potomac. Grounds and buildings, with all original design of furnishings, as when Martha Washington was mistress, have been restored. Property was purchased in 1860 by the Mount Vernon Ladies' Association, the present owners.

THE SCOTTISH RITE TEMPLE

Corner 16th and S Sts.
Open 9:00 to 5:00 to interested fraternal members

One of the many pretentious and modern lodge buildings of Washington, and the finest Masonic building in the world. Home of the Supreme Council of the thirty-third degree for the Southern Jurisdiction of the United States.

THE MUNICIPAL BUILDING

14th St. and Pennsylvania Ave.

Constructed of Vermont marble at a cost of some two million dollars. An excellent example of the modern tendency to produce public buildings of the greatest beauty. It contains the offices of the District Commissioners and all Municipal Departments except the courts. Washingtonians have no vote: three Commissioners are appointed by the President and confirmed by the Senate.

## UNITED STATES TREASURY

15th St. and Pennsylvania Ave.
Guides available 10:30 to 12:00 and 12:30 to 3:00

Just east of the White House. Is the most substantial of Washington government buildings. Completed in 1867 at a cost of seven million dollars, but already only about half large enough to accommodate Treasury employees.

## HYGIENIC LABORATORY, U. S. P. H. S.

25th and E Sts.

A perfectly-appointed laboratory, employing a staff of eighty. Divisions of Pathology, Bacteriology, Zoölogy, Pharmacology, Chemistry. Reference Library of fifteen thousand books and reprints. Art-room for U. S. P. H. S. Publications. Incubator, Cold, and Animal Observation Rooms. Routine includes Analysis of Specimens, Distribution of Cultures, Distribution of Pasteur Treatments and of Vaccines.

NEW NATIONAL MUSEUM
Smithsonian Grounds in the Mall
Open 9:00 to 4:30

Located on the grounds of the Smithsonian Institution. The buildings were erected at a cost exceeding three million dollars. It is the authorized depositary for all objects of scientific, artistic, and historic merit which come into the government's possession. The Collections include Exhibits representing the Customs and Industries of the American Indian, and a Natural History Exhibit of the Fauna of the United States.

VIEW IN CREEK PARK

DEC 98